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Vol. XIII, No. 7 JULY, 1924

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

CONTENTS

Frontispiece and Sketch—H. A. B. Dunning 591
Editorial:
All-Pharmacy Building Project Is Being Well Supported and Progress Is Gratifying 595
Another Step Forward 596
Publicity for Pharmacy 596
Why the American Pharmaceutical Association—Whelpley 597
Diethylphthalate. II.—Handy and Hoyt 600
Adsorption of Iodine from Organic Solvents by Red Phosphorus and Charcoal—Gordon and Krantz, Jr. 609
Dichloramine-T and Chlorcosane—Salkin 613
New Guaiacol Derivatives—Winkelblech 619
Quantitative Determination of Iron in Basham's Mixture—Mayer 623
Boron Compounds of Oxalic Acid—Cretcher and Hightower 625
Notes on the Iron-Greening Factor of Digitalis—J. C. and B. L. DeG. Peacock 629
The Quantitative Determination of Camphor in Pharmaceutical Preparations—Vieth and Bilhuber 636
Bibliography of Pharmaceutical Research—DuMez 638
Chain Stores in the United States—Eddy 643
What a Big City Drug Store Holds Out for a Recent Graduate—Rudes 645
Modern Pharmacy in China—Lee 650
What Should a Pharmacist Know to Serve Fully—Koch 652
The Department of the American Conference of Pharmaceutical Faculties 653
Pharmaceutical Formulas 655
Association Business 658
Committee Reports 662
Proceedings of the Local Branches 664
Editorial Notes 665
Obituary 667
Societies and Colleges 668
The Pharmacist and the Law 674
Book Notices and Reviews 676
Advertising—Cover pages 2, 3 and 4, and pp. I–XXII.

Published Monthly by the American Pharmaceutical Association: Office of Publication, 211 Church St., Easton, Pa. Editorial Office, 253 Bourse Building, Philadelphia, Pa. Annual Subscription, $4.00; Single Numbers, 35 Cents.

THE SEVENTY-SECOND ANNUAL CONVENTION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN BUFFALO, N. Y., DURING THE WEEK OF AUGUST 25TH.

The 1924 meetings of the American Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy will also be held in Buffalo, during the week of August 25th.

For Association Roster see pages x, xii, xiv and xvi.

Entered as second-class Matter, January 23, 1917, at the Post Office at Easton, Pa., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103. Act of October 3, 1917, authorized July 10, 1918.

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H. A. B. DUNNING.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XIII JULY, 1924 No. 7

H. A. B. DUNNING.

If Dr. Dunning should do no more for the American Pharmaceutical Association than he has accomplished as chairman of the Headquarters Building Campaign, he has earned a place among her leaders; if he does no more for organized pharmacy than he has as leader in the first national movement in which pharmacists of every class have joined their efforts, he will deserve the gratitude of every pharmacist—and it is likely that the significance of this latter phase of Dr. Dunning's work will not be overlooked in all future efforts for pharmacy in a national way.

Henry Armit Brown Dunning, named for a noted Philadelphia lawyer and orator who was a close friend of his father's, was born at Denton, Caroline County, Maryland, October 24, 1877. He grew up on a farm and was trained in the schools of the town. An uncle, Mr. J. H. Redden, conducted a pharmacy in Denton and this accounts for Dr. Dunning's interest in and connection with the profession.

After an apprenticeship with Mr. Redden, he entered the Maryland College of Pharmacy, now the School of Pharmacy of the University of Maryland, in 1896, graduating in 1898, and later was given the degree of Doctor of Pharmacy. Dr. Dunning has taken a great interest in the school as a member of its Alumni Association, as a member of its Board of Examiners, as its Associate Professor of Chemistry from 1903 to 1913, and as an active member of the Committee on the School of Pharmacy which the Maryland Pharmaceutical Association has continued since the school became a part of the state university in 1920.

While a student, he was employed for a short time by E. R. Downes and Company and then by Hynson, Westcott and Co., to the further development of which business he has since given his principal effort. He filled various positions in this business; some years ago he became a member of the firm, when the name was changed to Hynson, Westcott & Dunning, and succeeded to the presidency upon the death of the late Dr. H. P. Hynson. The business and the modern plant which houses it at Charles and Chase Streets is owned by Mr. Westcott and Dr. Dunning. In addition to the strictly professional pharmacy which is among the most noted in this country, a manufacturing business, national in its scope and very unique,

has been developed since about 1910 and is rapidly becoming one of the important industries of Baltimore.

In order to better prepare himself for the increasing demands of his business, Dr. Dunning took special courses at the Johns Hopkins University, specializing in organic chemistry, and some of his original work in connection with the development and improvement of the products of his company would have earned him a reputation as a research chemist if done individually.

Organization work has claimed its share of his time. He has been a member of the Maryland Pharmaceutical Association for many years, has served on various committees, as chairman of its Executive Committee and is now the First Vice-President. He joined the American Pharmaceutical Association in 1902 and has given service in various capacities, particularly as secretary and chairman of the Section on Practical Pharmacy and Dispensing and as a member of the Revision Committee of the National Formulary for several years. His firm is a member of the American Drug Manufacturers' Association and he presided as chairman of its Scientific Section at the recent annual meeting. He also holds membership in the American Chemical Society and various other scientific and professional bodies.

Dr. and Mrs. Dunning and their children live in Guilford, a residential suburb of Baltimore. For many years, Dr. Dunning has given considerable of his time to athletics, being especially interested in handball and wrestling and lately in golf and motoring. This interest in athletics has drawn him into the work of the Y. M. C. A. He was also for some time a member of the Maryland National Guard, serving with it during the Spanish-American War.

This is a brief résumé of the interests and work of this pharmacist who has demonstrated his interest in the American Pharmaceutical Association in a most practical manner. He believes in its future if properly equipped and endowed, and is willing to give of his time and success to its development. In the prime of life, a logical thinker, a consistent and effective worker, devoted to his profession—Pharmacy in general, his state association and the American Pharmaceutical Association look forward to his greater success.

E. F. K.

BUSINESS AS A PROFESSION.

Dean Wallace B. Donham of the Harvard School of Business Administration in an article contributed to the *Boston Transcript* explains that case material for teaching business represents the problems of going concerns, some of them of national prominence.

"When a case has been prepared and edited by the faculty it is presented to the students as a business problem for solution by each individual. An effort is made to give all pertinent facts and many impertinent ones, exactly as they arose in the experience of the concerns from whom they were obtained. In some cases the conclusions reached by the executive are given; in other cases they are not. And sometimes the results of the decisions of the firm are given. The students analyze the cases and discuss with the instructor the pros and cons of their various conclusions.

"From studying these cases the student gains a knowledge of business principles and practices common to all sound businesses. The idea is often expressed by business men that their own business is entirely individual and that the study of other business would not afford them any guidance. Almost without exception such a belief is not warranted. All industries are confronted at one time or another with more or less the same problems which have to be met more or less the same way."

EDITORIAL

E. G. EBERLE, EDITOR 253 Bourse Bldg., PHILADELPHIA

ALL-PHARMACY BUILDING PROJECT IS BEING WELL SUPPORTED AND PROGRESS IS GRATIFYING.

IN discussing the present All-Pharmacy undertaking before State Pharmaceutical Associations, Chairman E. L. Newcomb has pointed out that while the average retail druggist may not be so deeply concerned relative to the establishment of a comprehensive pharmaceutical library, a research laboratory or a pharmaceutical museum, he is vitally interested in any move which will help to combine, concentrate and centralize the present more or less divided power and influence of American pharmacy.

The drug industries are at present represented by no less than nine national organizations; each is important in its sphere and they render valuable service to all branches of pharmacy. Each of these national organizations has specific problems for solution and coöperation of those directly concerned and those contributing to their growth and development aid in the solution of them; for the big problems of American pharmacy affect to some extent every department of its industries.

Lieutenant-Governor Hammill, of Iowa, recently said that the principal reason for the lack of success by pharmacists in congressional and state legislation was because pharmacists failed to acquaint the public fully with the service they are rendering and the importance of their profession to the country. Other professions and lines of business succeed in escaping unjust taxes and restrictive measures through thoroughly united organization efforts. There is much legislation which is necessary for meeting new conditions, such as drug store ownership, drug peddling, other unfair selling methods, regulations, etc. Perhaps never before in the history of the drug business have more taxes been applied to it and more rules and regulations formulated, necessitating a guide and imposing details which increase "overhead" costs. It is unnecessary to make specific mention because existing conditions emphasize the statement. These matters, however, concern every section of the drug trade and in the handling of the problems connected therewith the different organizations have, at times, worked as individuals, and not as a unit; coördinated coöperative action should obtain; the best results follow when differences of opinion relative to pharmaceutical legislation are winnowed and harmonized to render best service for common interests.

Other viewpoints have been presented and the message of this comment has heretofore been discussed. There is hardly a point that has not been stressed because of the general acceptance of the importance of the movement for establishing an All-Pharmacy building, and the enthusiasm developed thereby has brought into closer relation all the divisions of the drug trade; this alone has been well worth the undertaking. It remains for us to bring the effort to a prompt conclusion prior to the Buffalo Convention and for this most coveted goal "let us pull long, strong and all together!"

E. G. E.

ANOTHER STEP FORWARD.

UNDER the above caption an editorial in a recent issue of the Philadelphia *North American* supported the idea of using business as the basis for further development of international good feeling, and thus strengthening the bond of unity. The editorial was prompted by an address at the recent Rotary International Convention, and the business ethics of this organization.

The reasoning is sound. World fellowship, as well as that of individuals and organizations, depends largely on "mutual understanding of common ideals and cooperative effort toward realization in the practical dealings of every-day life." Herein is one of our reasons for this comment, and the purpose of an "All-Pharmacy" headquarters implies just that.

The editorial referred to, discusses other possibilities for strengthening the bond of unity; one, by religious efforts, which have value, but the spiritual aims of different races and national groups are widely at variance. "Trading, called business," the comment recites, "is universal. Always it has been the basis for the first bond between discoverer and discovered. Inability to understand each other's language and amazement at each other's appearance or manners never have stood in the way of trade. Indeed, all relationships between nations have grown out of this one." A relative interrelation applies to trades and professions and it is well worth while to promote this to the fullest extent.

Pharmacy does not always receive the recognition from related professions, nor are pharmacists invariably given the title earned by them; perhaps the motives should not be questioned but at times the purpose seems strongly indicated. Professions serve and whatever tends to give the best service for humanity is the only course for them to follow. It has frequently been repeated in these columns that there is a widening field of medical science before us in which medicine, chemistry and the departments of special and direct concern to pharmacists will find much to do; there is a growing realization and coöperation in this direction; note the recent methods applied to important medical discoveries. The individual or the profession renders the greatest service that coöperates to give the largest number the greatest opportunity for development, contributing the best service to humanity and thereby adding to the wealth and health of civilization.

E. G. E.

PUBLICITY FOR PHARMACY.

THE bulletins of the Drug Trade Bureau of Public Information are giving good publicity for "All-Pharmacy." The larger daily newspapers, as well as those with lesser circulation, are assigning space for the information conveyed which indicates that the press and the readers are receptive, they want information on subjects pertaining to pharmacy, provided of course that it has a degree of interest.

The value of publicity is recognized by other professions and redounds to their advantage; it is almost unheard of that a physician or surgeon is referred to by a title other than that of his profession and it may be said with like assurance that a

chemist is infrequently designated as pharmacist, if he holds the respective degrees.

Some of the work pharmacists are doing is listed in the monthly bibliography of the JOURNAL A. PH. A. and the annual review of pharmaceutical botany and pharmacognosy, printed in the June number, includes a long list of pharmacists whose activities are centered in these branches but claim pharmacy as a profession.

Our comment is responsive to a press editorial on "Chemistry and Medicine," voicing approval of a pamphlet on "Chemistry in the Service of Medicine," issued by the "Committee to Extend the National Service of Harvard University." The particular import and object of the pamphlet is "to emphasize the value and necessity of close collaboration between Harvard Chemistry Department and the Medical School and to show how such collaboration is at present hampered by lack of due equipment in the chemical department." It is to be hoped and expected that the encouragement sought will be given, for the possibilities in this service are great.

Our effort always is to have pharmacy properly placed in the triangle wherein medicine, chemistry and the departments of special and direct concern to pharmacists render greater service because of such coöperation and strengthen the belief in one another. The further purpose of this comment is indicated in the first paragraph and to enlist the interest of pharmacists in this work by sending in to Director Robert P. Fischelis *important* items of general interest that may be utilized in these bulletins, and have them voice their approval of these news and educational items to the publishers if possible. Undoubtedly, when the pharmacy headquarters have been established the success of this publicity will be greater, but even now the laity will gain a better understanding of the mission of pharmacy and, in some instances, arrive at a different viewpoint.

Pharmacy and the achievements of pharmacy should more frequently be mentioned in press columns, and with an optimism that conveys assurance of its importance to those who are served thereby. E. G. E.

WHY THE AMERICAN PHARMACEUTICAL ASSOCIATION?*

BY HENRY M. WHELPLEY.[1]

It is an anomaly for me to bring you a message of greeting from the American Pharmaceutical Association as scheduled on the official program.

It is abnormal because I am one of you quite as fully as any other person present. My thirty years as secretary followed a third as many years of other Missouri Pharmaceutical Association activities. Thus you are now listening to a man talking to himself as it were. Thus I am that I am and also I am you. Nor does the anomaly end here. It has only just begun. Far more important is the very generally unrecognized fact that you are all a part of the A. Ph. A. Yes, each and every one of you who practice pharmacy to-day is a part of the A. Ph. A.

The seventy-two years of work by that organization have developed and saved to you all that distinguishes the retail druggist from the hardware man or the hand-me-out eat-shop proprietor. It is the A. Ph. A. part of you which justifies the ex-

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* Read at 1924 Missouri Pharmaceutical Association meeting, Springfield, Mo.

[1] Ex-President and for thirteen years treasurer of the A. Ph. A.

pressive slogan, "Your Druggist Is More than a Merchant." It is the A. Ph. A. blood in your commercial veins which makes it safe for the general public to "Try the Drug Store First."

I will, however, with pleasure and privilege formally extend to the Missouri Pharmaceutical Association and through it to you the fraternal good-will of the A. Ph. A. President, Prof. H. V. Arny, and President-elect, Mr. Chas W. Holton, who is a retail druggist.

In doing so, I know that every active member of the A. Ph. A. desires to join with his officers in the spirit of this message.

The A. Ph. A. work began in 1852 and continues uninterrupted to-day.

The A. Ph. A. operates on an altruistic basis free from politics.

The present-day concern of the organization outside of routine work is to render the benefits of the A. Ph. A. accomplishments more available to the general masses of retail druggists. The A. Ph. A. should appeal to druggists of every capacity and occupation. Even as it is now, each and every one of you breathe the atmosphere of the A. Ph. A. and daily realize in a financial, if not a mental way, on what has been done for your calling by the Association in nearly three-quarters of a century.

You say you do not belong to the A. Ph. A.? Perhaps not, but that is an anomaly, for you are a part of it and it is a part of you in spite of all protests.

You may be like a bank with only a receiving teller, but the A. Ph. A. accomplishments like money are the all-essential to your very existence.

You can resist joining as a child can run away from home, but you cannot avoid being a part of the A. Ph. A. as long as you are a druggist any more than a runaway child can cease to be a member of the family unless death severs the physical relation.

You are a part of the A. Ph. A. right where you are. As Einstein claims, we go somewhere without going anywhere.

Having attended forty consecutive meetings of the A. Ph. A. and taken part in the various activities, I speak knowingly as well as feelingly.

The A. Ph. A. is the only national organization in which all drug interests have an equal right and a mutual interest. The only one out of eight national drug organizations in operation to-day.

Napoleon was one of the first great leaders to recognize the practical value of the science of chemistry. Now chemistry holds a commanding position in the thoughts and lives of men and nations.

The drug journals of late have been filled with statements of what the A. Ph. A. has accomplished.

Who will be the Napoleon of the retail drug trade to recognize the practical every-day value of having a Pharmacopœia, a National Formulary, Drug Laws, Colleges, Boards, the N. A. R. D., the A. C. P. F., the N. A. B. P., the Drug Trade Conference, Pharmaceutical Research and multifarious other things that go to make up the conditions in drugdom?

Someone is needed who can humanize the past of the A. Ph. A., as Wells has humanized the history of man from his very beginning.

Someone who will make you thirst for a more intimate knowledge of the A. Ph. A. past and realize the full bearing it has on your present and on your future.

The Missouri Pharmaceutical Association has from almost the very beginning been constantly represented in the A. Ph. A. and assisted in directing its activities. Let us now give greater coöperation.

If all drug interests would unite, the accomplishments would soon make the World War victory look like small change.

The A. Ph. A. should reflect the local, state and other national conventions in any way devoted to the drug interest.

Most of these things I have said in retrospect but they are intended for the forward-looking safe and sane element which is dominant in the Missouri Pharmaceutical Association—those who are not adamantine but ready and anxious to be helpful to the calling from which they are making a livelihood.

It has been said that every association has at least one cynic. I know that some have a few to spare, but Missouri is fortunate in being cynic-free. And this, in spite of the fact that here as elsewhere man is Dame Nature's insurgent son.

Reformers and progressives even unto the point of extremists are all right and proper in their place. Even ultra-conservatists have their function in human affairs.

After all is said and done, the "middle of the roaders" keep the world moving in a safe and sane course as the history of the human race continues to unfold.

It is fortunate, indeed, and a wise provision of the Ruling Power that the middle of the road, instead of the sides or tangent outgrowths, is the one which is traveled most constantly by far the greater portion of humanity.

Every organization varies in value according to the individual viewpoint. Remember that the viewpoints of all in drugdom focus on the A. Ph. A. We are all following the same path of intent and purpose, but some have gone a little or a great deal farther than others.

The A. Ph. A. is not leading a life of apprehension and uncertainty. If anything, it is too safe and sound and self-content.

In my rambling remarks, I have not attempted to plead for the AMERICAN PHARMACEUTICAL ASSOCIATION but to awaken in you a realization of your relation to this great monument to pharmacy in America.

THE ORIGIN OF "PHARMACIEN."

M. Fialon (the veteran pharmacist who presented the "Musée Fialon" of ancient drug-pots *et hoc genus omne* to the Paris Faculty of Pharmacy a few years ago) contributes some notes on the history of the terms "apothecary" and "pharmacist." The latter term has designated the retail dispenser in France since the Revolution, and replaced the former, used under the "ancien régime" of the Monarchy. "Pharmacy" is an old word, but "pharmacien" seems only to have entered the French language in early Stuart days, and to have been used in the provinces before it came to Paris. Dr. Dorveaux cites its occurrence in works dated 1607 and 1609. M. Guitard has found a document dated 1640 (relative to the foundation of a Guild of Apothecaries at Marennes) in which sundry members are officially designated as "compagnon pharmacien," or, more frequently, "pharmatien." The two terms (pharmacist and apothecary) therefore existed concurrently in the pre-Revolution period. M. Fialon holds that they are not really synonymous. "Pharmacist," he says rather implies one expert in the art of pharmacy; "apothecary," he who keeps open shop; and (as he dryly adds) "all pharmacists are not in business as apothecaries, and there are apothecaries who are poor pharmacists." The abuse and ridicule heaped upon apothecaries by doctors in the sixteenth and seventeenth centuries made the name unpopular, and to this he traces the change of title.—*Chemist & Druggist*, April 1923, p. 545.

DIETHYLPHTHALATE II.*

BY J. A. HANDY AND L. F. HOYT.

I. INTRODUCTION.

During the past year we have accumulated additional data on the properties of diethylphthalate and have made a critical study of the methods for its detection, which have appeared in the literature. We are presenting the additional data thus acquired as a scientific paper entitled Diethylphthalate II.

II. METHODS FOR THE DETECTION OF DIETHYLPHTHALATE.

Owing to the fact that many subsequent experiments have confirmed the reports made by others that the method of detection outlined in our first paper on Diethylphthalate (1) tends to give what appear to be positive tests in samples known to be free from diethylphthalate—that positive "blanks" are in other words obtained—we have made an exhaustive examination of 3 methods for the detection of diethylphthalate. These methods are:

(A) Method of Andrew (3):**

"To 10 cc. of sample in a small porcelain capsule add 5 drops of a 10% solution of NaOH; evaporate just to dryness and add 0.5 cc. of a 5% aqueous solution of resorcin, again evaporate to dryness. Add at once, without the application of external heat, 6 drops of 1.84 H_2SO_4, cool and dilute with 20 cc. dist. H_2O made alkaline with 5 cc. of 10% NaOH."

Andrew claims by his method to be able to secure an undeniably positive test with 0.2 milligram of diethylphthalate.

(B) Method of Calvert (4):

"To 3 or 5 cc. of sample in a test-tube add 5 to 10 drops phenol, 10 drops of concentrated H_2SO_4, and heat slowly over a small flame until most of the alcohol has been driven off and the liquid assumes a red color. Cool and cautiously add 15–25 cc. distilled water when the red color will disappear and the liquid become turbid (if positive); now add an excess of sodium or potassium hydroxide. A red color denotes the presence of diethylphthalate or a phthalein in the sample.....The end reaction depends upon the formation of phenolphthalein by the action of hot sulphuric acid on phenol and diethylphthalate."

"In testing a sample of alcohol or a colorless solution the test may be applied directly, but in testing whisky better results are obtained by rapid distillation and the subsequent evaporation of the distillate to a small volume on a water-bath. Good results may be obtained by shaking out with light petroleum ether a few times and then evaporating off the petroleum ether at a comparatively low temperature."

Calvert claims that 1 cc. of a 1–1000 dilution of diethylphthalate (or 1 milligram) gives unmistakable results.

(C) Modified Mulliken Test of Handy and Hoyt. Subsequent experiments have shown that the amount of caustic used as a "fixative" can be cut down advantageously to 1 cc. of a 10% solution of NaOH. Directions are as follows:

To 5 cc. of sample in a small evaporating dish add 1 cc. of 10% NaOH solution and evaporate to dryness. Add 2 cc. of 1.84 H_2SO_4, heat for 1–2 min. on the steam-bath until thoroughly liquid and transfer the resulting mixture to a dry test-tube containing 0.05 Gm. resorcin. Heat for 3 minutes in an oil-bath at 160° C., shaking frequently to make sure that all of the resorcin

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* Scientific Section, A. Ph. A., Asheville meeting, 1923.

** Assistant chemist of the Connecticut Agricultural Experiment Station.

is dissolved in the acid. Cool, and transfer a small portion of the contents to a large test-tube containing 50 cc. dist. H_2O made alkaline with 5 cc. or more of 10% NaOH. A permanent yellowish green fluorescence shows the presence of diethylphthalate. Samples which contain any appreciable amount of saccharine matter must be extracted with petroleum ether and the test applied to this extract.

This work was undertaken, not in the spirit of justifying our original procedure, but for the purpose of bringing out to the best of our ability the advantages as well as the drawbacks of each method.

Both the Andrew method and our own are modifications of, or refinements of, the fluorescein-type test as described by Mulliken and first recommended by Lyons (2) in his article on the "Detection of Diethylphthalate in Whisky."

In the light of our subsequent experience it is evident that the cologne spirits used in the tests described in our previous paper was of a particularly high grade

TABLE I.—ALCOHOLS; COMMERCIAL, CHEMICALLY PURE, AND SPECIALLY DENATURED, COMPARATIVE BLANKS BY 3 METHODS FOR DETECTION OF DIETHYLPHTHALATE.

	Handy & Hoyt method (fluorescein test; heating 3 min. at 160° C.).			Andrew method (fluorescein test; no external heat applied).		Calvert method (phenolphthalein reaction).
Alcohol used.	Fresh.	After 48 hrs.		Fresh.	After 48 hrs.	
Cologne spirits, old sample	+, very faint	—		+	—	—, Colorless
Cologne spirits, stock of 2/20/23	+	—		Not tested (sample exhausted)		—, Colorless
Cologne spirits, stock of 4/12/23	+	—		+	—	—, Colorless
No. 30 denatured alcohol, new drum, recd. 3/7/23	+	—		+	—	—, Colorless
Merck's absolute alcohol	—	—		—	—	—, Colorless
Denatured Alcohols, Marked:	Fresh.	48 hrs.	1 wk.			
Denatured alcohol No. 1	+	—	—	+, Brownish green	—	—, Colorless
Denatured alcohol No. 3-A, 3/13/23	+	—	—	+, Faint	—	—, Colorless
Denatured alcohol No. 3-B	+	—	—	—, Orange-brown	—	?, Brown, turbid
Denatured alcohol No. 23-A, 5/22/22	+	—	—	—, Dark green	—	—, Colorless
Denatured alcohol No. 25, 10/5/21, Serial No. 41279	+	—	—	++, Amber	—	+, Deep pink
Denatured alcohol No. 31-A	+	—	—	—, Light amber	—	—, Colorless, turbid
Denatured alcohol No. 37, 2/21/22, Serial No. 60896	+	—	—	—, Brownish green	—	—, Pale yellow
Denatured alcohol No. 38-B, 3/6/22, Fed. Prod. Co.	+	+	—	+, Faint	—	—, Light orange
Denatured alcohol No. 39-A	+	+	—	—, Brownish green	—	?, Dark brown
Denatured alcohol No. 40	+	+	—	—, Brownish green	—	—, Colorless

since it gave truly negative blanks such as are obtained with a carefully purified and rectified absolute alcohol or other specially treated alcohols.

We wish to emphasize particularly that the tabulated results which follow, on commercial and denatured alcohols, aldehydes, ketones, and the other organic chemicals were all obtained by the same analyst. It is quite possible that other chemists employing slightly different technique and using chemicals and testing reagents from various sources might not secure exactly the same results, either as to intensity or shade obtained in the final test solutions.

II (*b*) Fluorescent phenomena and color reactions obtained with:

(1) Commercial and chemically pure alcohols.

(2) Specially denatured alcohols.

A large number of samples of commercial alcohol both cologne spirits and denatured alcohols were subjected to "blank" tests by the three methods described above, with the results as shown in the Table I. In all cases the tests were applied directly, *i. e.*, without extraction with petroleum ether, or other treatment, to a 5-cc. portion of the alcohol.

DISCUSSION OF RESULTS.

Handy and Hoyt Method.—A point of great importance is brought out by this extended series of blanks, *viz.*, that with most samples of alcohol a *temporarily* positive "blank" test is obtained by the Handy and Hoyt method when diethylphthalate is known to be absent. In the great majority of cases, however, these initially positive tests become entirely negative within 48 hours—usually in much less time—and in no case has this temporary fluorescence persisted more than 4 or 5 days. While it is true that this temporary fluorescence in blank tests when freshly made cannot be distinguished at the start from the fluorescence produced by a trace of diethylphthalate, the fluorescence obtained from diethylphthalate retains its intensity undiminished—in our own experience, exposure of such solutions to direct sunlight in unstoppered test-tubes for 2 months caused no appreciable diminution in the intensity of the fluorescence. Our results show that absolute alcohol (Merck's) gives a negative "blank" by our method. In the case of a sample of cologne spirits which gave a positive "blank" the intensity of the fluorescence was found to be directly proportional to the amount of sample used—2 cc. gave a recognizable fluorescence, while 5 or 10 cc. gave a proportionally more intense test. Some of this same alcohol was refluxed for 3 hours after the addition of 10% of its weight of solid KOH and then distilled. The distillate gave entirely negative blanks, irrespective of the amount of sample used. The addition of a small amount of commercial acetone to this purified cologne spirits caused it to give a positive blank with an intense, though temporary fluorescence.

The 3 samples each of cologne spirits and No. 30 denatured alcohol all gave positive tests, but of great variation in intensity. One of the No. 30 alcohols, a sample of poor quality from a rejected shipment, which contained acetone, gave a very intense test whereas an older sample of good quality gave only a faintly positive test. The other samples of 10 different denatured alcohols all gave initially positive blanks on 5-cc. quantities—but it is again emphasized that all of these positive tests became entirely negative on standing, mostly within 48 hours or less.

Andrew Method.—The results by the Andrew method are essentially parallel to those obtained by the Handy and Hoyt method. In general the intensity of the

fluorescence is less in the Andrew tests. Some of the special denatured alcohols gave negative blanks, but in other alcohols and particularly with cologne spirits and No. 30 alcohol, positive blanks with a very distinct fluorescence resulted. All of these positive blanks faded out, and somewhat more rapidly, than occurred with parallel tests by our own method.

Calvert Method.—With cologne spirits or denatured alcohols which do not contain interfering substances the Calvert method gives entirely negative blanks. Some of the denatured alcohols tested, especially 3-B and 39-A, contained substances which reacted with the phenol and H_2SO_4 in such a way as to give dark or highly colored solutions in which it would be impossible to detect the light and fugitive pink color given in this test by small amounts of a phthalic acid derivative. Denatured alcohol formula No. 25 containing iodine gives an intense reddish violet color which might be mistaken for a positive test by the Calvert method. In general, however, this method, when applied to alcohols, may be considered to give very satisfactory negative blanks.

TABLE II.—BLANK TESTS ON ALDEHYDES AND KETONES BY 3 METHODS.

Name of aldehydes or ketones.	Handy & Hoyt method (fluorescein reaction; external heat applied). Fresh.	After 4 days.	Andrew method (fluorescein reaction; no external heat). Fresh.	After 2 days.	Calvert method (phenolphthalein test).
Aldehyde, aliphatic Formaldehyde	++	—	+, Faint dark green	—	+, Faint brownish pink
Aldehyde, aliphatic Acetaldehyde	+, Very faint	—	++, Pinkish	—	+, Distinct pink but fades very rapidly
Aldehyde, aliphatic Citral (geranial)	+	—	+	—	—, Light yellow
Aldehyde closed ring Furfuraldehyde (furfurol)	++, Dark reddish brown	—	+	—	+++, Intense brownish pink, permanent
Aldehyde, aromatic Benzaldehyde	+	—	+	—	+++, Intense purplish pink, permanent
Ketone, aliphatic Acetone	+	—	++	—	—, Orange-brown
Ketone, aliphatic Musk ketone	—	—	—, Brownish green	—	—, Pale yellow
Ketone, aliphatic Methylheptenone	—	—	—, Brownish green	—	—, Pale yellow
Ketone, aromatic Acetophenone	—	—	—, Milky	—	—, Milky solution
Ketone, aromatic Camphor	+, Trace fluores.	—	—, Colorless	—	—, Colorless
Ketone, aromatic Ionone	++	—	+, Brownish green	—	—, Light orange

II (B). (3) ALDEHYDES AND KETONES.

It was thought that impurities, particularly aldehydes and ketones, in the alcohols tested might be the cause of the temporarily positive blanks obtained

with Andrew's method and our own. Accordingly we subjected a variety of representative aldehydes and ketones, both aromatic and aliphatic, to the regular procedure of both methods as well as the Calvert method, for further comparison.

In all of these tests 1 drop, if a liquid, or 0.03 Gm. if a solid, of the aldehyde or ketone was used. The results of these "blank" tests on aldehydes and ketones, made in the absence of alcohol, are shown in Table II, on preceding page.

The tabulated results show clearly how all 5 aldehydes gave positive tests, of different degrees of intensity by all 3 methods, with the one exception of citral by the Calvert method. With our method it was the formaldehyde which gave the most intense test of the 5 aldehydes; with Andrew's method the acetaldehyde reacted most intensely and with the Calvert method closed ring furfuraldehyde and the aromatic benzaldehyde gave intense permanent tests; although the color of the final solution in these cases was a purplish red instead of a phenolphthalein pink, the test might easily be mistaken for a positive result.

All of the ketones tested gave a negative result by the Calvert test. Both acetone and ionone gave temporarily positive tests by both Andrew's method and our own, while the other four ketones gave tests negative, or practically so, by these two methods.

All of the initially positive results obtained by the Andrew method and our own became entirely negative within 48 hours. In the case of the Calvert method the positive tests with furfuraldehyde and benzaldehyde retained the peculiar purplish red color with undiminished intensity. The color so obtained is, to be sure, not the true phenolphthalein reddish pink, but might be mistaken for a positive test for a phthalein. These tests were repeated several times, always with the same results.

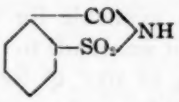
II (B). (4) OTHER ORGANIC CHEMICALS.

FLUORESCENT PHENOMENA AND COLOR REACTIONS RESULTING FROM CONDENSATION OF RESORCINOL AND PHENOL WITH SUBSTANCES OTHER THAN PHTHALIC ACID DERIVATIVES.

Fluorescein, the product resulting from the condensation of one phthalic acid derivative with two resorcinols, is a perfectly definite chemical compound which shows an intense, and permanent yellowish green fluorescence in alkaline solution.

Consequently when an unknown substance is condensed with resorcinol and the product dissolved in dilute alkali, a yellowish green fluorescence if obtained is normally regarded as proof of the presence of a phthalic acid derivative. It is accordingly of prime importance to know whether or not substances other than derivatives of phthalic acid will condense with resorcinol in such a way as to give a fluorescent solution which might be classed as a positive test for phthalic acid derivatives—and particularly diethylphthalate.

A recent article by Dutt (5) entitled "Dyes Derived from Saccharin. The sulphamphthaleins" called our attention to the fact that saccharin could be made to condense with a number of phenolic substances, including resorcinol, to produce compounds closely analogous to the corresponding phthalic acid—phenolic substance condensation products. Saccharin is not a derivative of phthalic acid—it is the inide of *o*-sulphobenzoic acid, thus:

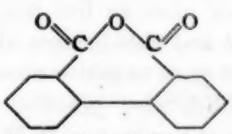


An experiment quickly showed that saccharin would condense with resorcinol when heated as in the Handy and Hoyt or Andrew diethylphthalate tests to form a product which showed a strong yellowish green fluorescence in alkaline solution. When freshly prepared such a solution would easily be mistaken for the fluorescein test made on diethylphthalate, although the saccharin-resorcinol compound (called resorcinol sulphamphthalein by Dutt) was found to gradually lose its fluorescence, so that after standing for 4–5 days such a solution is practically devoid of fluorescence, although a genuine fluorescein test as obtained on diethylphthalate will retain its fluorescence with no detectable diminution for weeks under the same conditions.

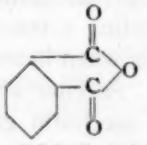
Some other chemicals including gallic, benzoic and salicylic acids were tested by heating them with resorcinol and 1.84 H_2SO_4 for 3 min. at 160° C. These compounds all gave negative tests for fluorescence. Two other more or less common compounds, succinic acid and malic acid (hydroxysuccinic acid) heated with resorcinol and H_2SO_4, resulted in condensation products which in alkaline solutions were intensely fluorescent. Succinic acid particularly gives a compound whose solution in alkali both in shade and intensity is indistinguishable *when freshly prepared* from fluorescein. Fortunately the succinic acid and malic acid fluorescent derivatives do not retain their fluorescence, their alkaline solutions like that of the corresponding saccharin compound fade out quite rapidly so that after 24–48 hours the intensity of the fluorescence is much reduced and in less than a week they have lost practically all of their fluorescence.

Lang in an article entitled "Some Interesting Reactions of Resorcinol" (7) describes the preparation of an orange-red dye, soluble in alkaline solution with a greenish fluorescence, by condensing formic acid with resorcinol in the presence of sulphuric acid. This reaction was tried out and it was found that a reaction takes place even without the application of external heat, with the evolution of considerable gas and much heat, producing a deep orange solution from which on cooling an orange-red precipitate separates out. This dye was found to exhibit a very intense yellowish green fluorescence in alkaline solution, indistinguishable when fresbly prepared from that of fluorescein. This formic acid-resorcinol compound was likewise, however, found to exhibit only temporary fluorescence, the intensity being greatly diminished after standing over night, and to be practically imperceptible after standing 4–5 days.

Bischoff and Adkins (8) have recently described the preparation of still another, and entirely new, compound, very similar in its properties to fluorescein, by condensing diphenic anhydride with resorcinol. The similarity of the reaction products is to be expected on account of the close relationship of the structural formulas of diphenic anhydride and phthalic anhydride, thus:



Diphenic anhydride



o-Phthalic anhydride

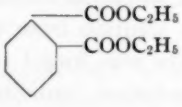
No diphenic anhydride was available for the verification of Bischoff and Adkins experiment, but an attempt was made to condense diphenyl oxide (diphenyl ether) with resorcinol, by heating at 160° C. for 3 min. with H_2SO_4 in the usual manner. The final solution in alkali was, however, entirely devoid of fluorescence or color. It is evident that no condensation takes place with an ether and that the presence of two O-carboxylic groups or the corresponding anhydride grouping is essential for the formation of a fluorescent product comparable to fluorescein.

Comparative tests were made by heating 0.05 Gm. each of diethylphthalate, saccharin, succinic acid, malic acid, and formic acid with 0.05 Gm. resorcin and 2 cc. 1.84 H_2SO_4 for 3 min. at 160° C. Each of the five fusions was poured into 500 cc. of water containing 25 cc. of 25% NaOH solution. The following table describes the results obtained.

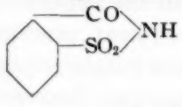
	Fresh.	After 1 week.
1. Diethylphthalate	Intense yellowish green fluorescence	Same as when fresh; undiminished intensity
2. Saccharin	Strong greenish fluorescence; solution brownish pink by transmitted light	Fluorescence entirely gone; solution brownish
3. Succinic acid	Intense yellowish green fluorescence; exactly like No. 1	Faint trace of fluorescence; solution light amber
4. Malic acid	Yellowish brown, with greenish fluorescence	Fluorescence entirely gone; solution brownish
5. Formic acid	Intense yellowish green fluorescence; exactly like No. 1	Fluorescence entirely gone; solution pale brownish yellow

Examination of the structural formulas of these first 4 compounds shows that they are substances (or derivatives of substances) which are characterized by having two COOH groups in the ortho position and that this type of compound can readily form internal anhydrides. Formic acid, the simplest of the organic acids. apparently reacts with resorcinol as though 2 molecules of it formed an anhydride.

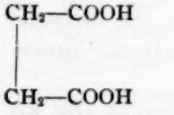
1. Diethylphthalate (deriv. of O-phthalic acid)



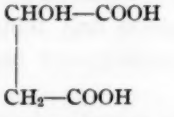
2. Saccharin (deriv. of O-sulphobenzoic acid)



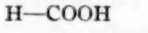
3. Succinic acid



4. Malic acid



5. Formic acid



It is possible that the solutions in alkali of the resorcinol condensation compounds of saccharin, and malic, succinic and formic acids which show this intense though temporary fluorescence could be differentiated from a solution of true fluorescein by an examination of their respective absorption spectra.

The substances saccharin, succinic acid and malic acid, which all give rise to products exhibiting a temporary fluorescence more or less resembling that of genuine fluorescein when heated with resorcinol and H_2SO_4, were also subjected to the Calvert test. Succinic acid and malic acid gave negative results, but as had been anticipated saccharin gave a strong reddish pink positive test. In other words saccharin will condense with phenol in the presence of H_2SO_4 to form a

compound which is closely analogous to phenolphthalein. Dutt in his article (5) describes the condensation product of phenol and saccharin, which he calls phenolsulphamphthalein, stating that it is pink in alkaline solution and that its sodium salt is a dark red hygroscopic solid.* When equal quantities of diethylphthalate and saccharin were subjected to the Calvert test, final solutions of the same intensity of red or pink color were obtained which faded at the same rate. The Calvert test is fully as sensitive for saccharin, 1 mg. of which gives a strong positive test, as it is for a phthalic acid derivative and the test does not differentiate between these substances. Hence in testing an unknown by the Calvert test, if a positive result was obtained it would be necessary to prove the absence of saccharin in the portion tested in order to draw a correct conclusion as to the presence of a phthalic acid derivative. Saccharin in the form of its sodium salt, *i. e.*, soluble saccharin, is in our experience practically insoluble in petroleum ether. Hence extraction of an unknown sample with petroleum ether, which is nearly always advisable, should eliminate saccharin.

Both formic acid and diphenyl oxide when subjected to the Calvert test for diethylphthalate give an entirely negative result, a straw-colored final solution being produced. Similar negative tests were also given by gallic, benzoic and salicylic acids.

Since these three substances, saccharin, succinic acid and malic acid, might each or all be present in an alcoholic beverage (*i. e*, a beverage not distilled) which it was desired to test for the presence of diethylphthalate, an experiment was made to determine their influence on the diethylphthalate test. A sample of sweet wine was used as the beverage.**

Seven 25-cc. portions were made up as follows:

1. Blank; nothing added
2. 25 mg. diethylphthalate = 0.1%
3. 2.5 mg. diethylphthalate = 0.01%
4. 25 mg. saccharin = 0.1%
5. 25 mg. succinic acid = 0.1%
6. 25 mg. malic acid = 0.1%
7. 25 mg. succinic acid = 0.1% and 2.5 mg. diethylphthalate = 0.01%

The seven samples were marked in code by an assistant so that the analyst might make the diethylphthalate test on the seven samples as unknowns.***

Each sample was diluted with an equal volume of water and extracted once with 25 cc. petroleum ether. The three diethylphthalate detection tests were applied to portions of the extract of each sample. For both the Andrew and Handy-Hoyt methods 5 cc. of the petroleum ether extract (equivalent to 5 cc. of original

* This compound is very closely related to phenolsulphonphthalein, more familiarly known as phenol red, an indicator with a p_H range of 6.8–8.4. Clark's "The Determination of Hydrogen Ions," pub. 1920, by Williams and Wilkins, states on p. 63 that phenolsulphonphthalein was first prepared by Sohon in 1898, working under Remsen. Slagle (6) describes its preparation by the fusion of the anhydride of O-sulphobenzoic acid (obtained by appropriate methods from saccharin) with phenol.

** Saccharin might occur as an added sweetening agent, while succinic acid is stated to be a normal by-product of alcoholic fermentations and malic acid to occur in the free state in the juice of several fruits.

*** By placing on the tongue 3 drops of each of the original samples before extraction it was possible by the sense of taste to state with absolute conviction that No. 2 contained diethylphthalate and No. 3 saccharin. The other 5 samples could not be differentiated with any degree of certainty.

TABLE III.—DETECTION OF DIETHYLPHTHALATE IN A BEVERAGE IN PRESENCE OF POSSIBLY INTERFERING SUBSTANCES.

Calvert.	Andrew.		Handy-Hoyt.			
Code mark.	(a) Fresh.	(b) After 24 hrs.	(a) Fresh.	(b) After 24 hrs.	Conclusion from Andrew, and Handy and Hoyt tests.	Sample actually contained.
1. Amber—negative	Brownish green; slight fluorescence	No fluorescence (−)	Distinct fluorescence	No fluorescence (−)	No diethylphthalate	Malic acid 0.1%
2.—Pink; persisted about 10 min. (+) shows presence of diethylphthalate	Intense yellow-green fluorescence	Same as (a) (+)	Intense yellow-green fluorescence	Same as (a) (+)	0.1% diethylphthalate	0.1% diethylphthalate
3. Amber—negative	Distinct yellowish green fluorescence	No fluorescence (−)	Distinct fluorescence	No fluorescence (−)	No diethylphthalate. (By sense of taste contains saccharin)	0.1% saccharin
4. Amber—negative	Brownish green, very slight fluorescence	No fluorescence (−)	Slight fluorescence	No fluorescence (−)	No diethylphthalate	Blank
5. Light brown, with very fugitive pale pinkish shade; possibly (+)	Brownish green, distinct fluorescence	Same as (a) (+)	Distinct fluorescence; more intense than 1, 3, 4 and 6	Same as (a) (+)	Contains small % of diethylphthalate	0.01% diethylphthalate
6. Amber—negative	Pale yellow, no fluorescence	No flourescence (−)	Slight fluorescence	No fluorescence (−)	No diethylphthalate	0.1% succinic acid
7. Light brown; no pinkish coloration observed — negative	Brownish green, strong fluorescence	Same as (a) (+)	Distinct fluorescence	Same as (a) (+	Contains small % of diethylphthalate	0.1% succinic acid. 0.01% diethylphthalate

sample) was used; for the Calvert method the remaining 15 cc. of extract (equivalent to 15 cc. of original sample; 3 times the quantity used for either of the fluorescein reaction tests) was used. The results are shown in Table III.

When freshly prepared all the final solutions obtained by the Andrew and Handy-Hoyt tests showed varying degrees of fluorescence. Even when fresh, by both tests the No. 2 sample showed diethylphthalate by its strong and unmistakable fluorescence and the No. 5 and No. 7 samples in both cases were suspicious. After the tests had stood over night the only samples in either set which showed fluorescence were the No. 2, No. 5 and No. 7 samples. Even in the No. 5 and No. 7 test portions which contained at the most not over 0.5 mg. of diethylphthalate the fluorescence stood out clear and unmistakable and could easily be differentiated from Nos. 1, 3, 4 and 6 even when viewed from a distance.

This series of experiments, II (*b*) (4), has brought out the following facts:

1. A substance which shows a yellowish green fluorescence in alkaline solution is not necessarily fluorescein.

2. Saccharin (or *o*-sulphobenzoic acid or its anhydride), succinic acid, malic acid, and formic acid will condense with resorcinol to give compounds which exhibit marked, though transient, fluorescence in alkaline solution. (According to the experiments of Bischoff and Adkins, diphenic anhydride would also be included in this list of compounds.)

3. Saccharin (or *o*-sulphobenzoic acid or its anhydride) has been found to react in a manner identical with diethylphthalate in the Calvert test. Water-soluble saccharin is, however, practically insoluble in petroleum ether and hence does not interfere when testing the petroleum ether extract of a sample containing saccharin for diethylphthalate.

4. Diethylphthalate detection tests made on the petroleum ether extract of portions of a sweet wine containing, respectively, 0.1% of these substances, *i. e.*, saccharin, succinic acid and malic acid, give entirely negative results provided the final test solutions are allowed to stand over night before the interpretation of the results is made.

5. Either the Andrew or Handy and Hoyt method will differentiate correctly between a sample of sweet wine containing 0.1% succinic acid (which in our experience condenses with resorcinol to give a test solution most nearly like that of true fluorescein) and a sample containing only 0.01% diethylphthalate in addition to 0.1% succinic acid, on test portions of the samples as small as 5 cc.

(To be concluded in next issue. Bibliography will appear at end of the article.)

ADSORPTION OF IODINE FROM ORGANIC SOLVENTS BY RED PHOSPHORUS AND CHARCOAL.*

BY NEIL E. GORDON† AND JOHN C. KRANTZ, JR.

Bancroft,[1] in suggesting a number of interesting research problems through the National Research Council, mentioned the work of Sistini[2] who had found that car-

* Read before the Section on Physical Chemistry of the American Chemical Society 1924. Released for publication in JOUR. A. PH. A.

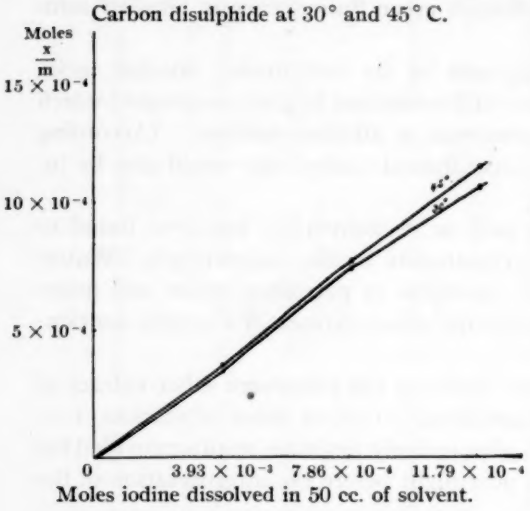
† Head of the Department of Chemistry, University of Maryland.

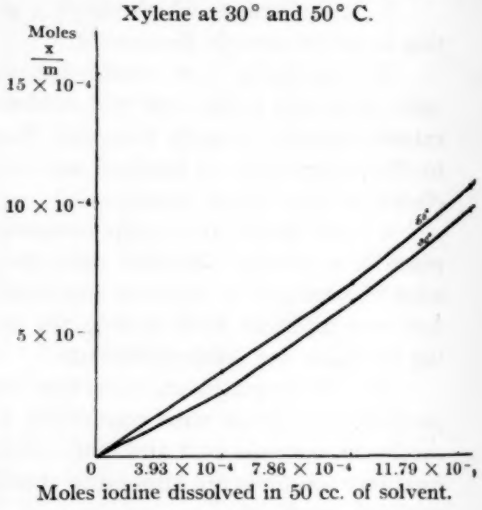
[1] Bancroft, *J. Ind. Eng. Chem.*, 13, 154, 1921.

[2] Sistini, *Gazz. chim. ital.*, 31, 216, 1871.

bon disulphide was completely stripped of iodine dissolved therein by contact with red phosphorus. The writer suggested that it would be interesting to perform the experiments and plot the curves of adsorption for different temperatures; for it was thought, by Bancroft, that as the density of phosphorus changed with the temperature, at an increased temperature the phosphorus would expose a greater surface and consequently a greater adsorption would result.

These experiments were carried out with six of the organic solvents—benzene, toluene, xylene, carbon tetrachloride, carbon disulphide and chloroform. The usual methods of drying and purifying the solvents were employed; the red phosphorus was of good commercial variety, dried for three hours at 110° C. and sifted through a bolting cloth sieve. At the first consideration, it was thought that Bancroft's suggestion was correct as shown here by the adsorption data and curves for xylene and carbon disulphide. When, however, the adsorption was applied to





carbon disulphide, the stripping of the iodine as recorded by Sistini could not be duplicated, as in all cases there remained a considerable quantity of iodine in the carbon disulphide after adsorption equilibrium had been established. The inference was that, in all probability, Sistini had present in his adsorption mixture some impurity which caused either chemical reaction or increased adsorption. The most natural foreign substance thought to be present was water. Experiments were performed introducing a small quantity of water (1 cc. to 50 cc. of solvent) in the adsorption mixture and not only with carbon disulphide, but with the other organic solvents, the iodine was completely removed. We believe this to be due to chemical reaction between the iodine and phosphorus in the presence of water, further that the different curves that were obtained for different temperatures were probably due to increased or decreased chemical reaction due to the water unavoidably present in the adsorption mixture.

Bancroft also referred to the work of Davis,[1] who worked along those same lines using different charcoals as adsorbents, as being one of the most outstanding articles published in this work. An examination of the work of Davis showed that

[1] Davis, *J. Am. Chem. Soc.*, 91, 1682, 1907.

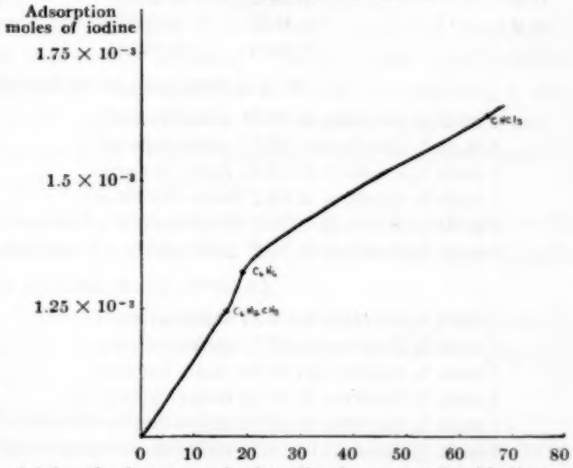
this experimenter had drawn the conclusion that there was no relationship between the solubility of iodine in the solvents and the quantity adsorbed. These relationships were expressed as usual in grams; it occurred to the writers to convert these quantities to moles and arrange these molar quantities in the inverse order of their molar solubilities. Three of the solvents used by Davis were selected, in which there was little likelihood of chemical reaction between the solute and solvent, and the following data and curve were obtained:

Solubility of Iodine at 30° C.	Moles Iodine Adsorbed 30° C. by Charcoal.
1 mole I_2 dissolves in 15.75 moles toluene	Toluene 1.24×10^{-3}
1 mole I_2 dissolves in 18.35 moles benzene	Benzene 1.31×10^{-3}
1 mole I_2 dissolves in 64.20 moles chloroform	Chloroform 1.62×10^{-3}

It will be noticed that the adsorption calculated in terms of moles shows an inverse relationship to the solubility of iodine in the organic solvent, when this too is calculated in moles.

This relationship having been established, the writers endeavored to show the same relationship with the data obtained in the phosphorus experiments. An examination of the tabulated results will show that this relationship does not hold in the case of phosphorus, although the results are expressed in moles; this we attribute to chemical reaction due to traces of water.

Molar solubility and moles adsorbed organic solvents, iodine and charcoal at 30° C.



EXPERIMENTAL.

Introduce 1 Gm. of red phosphorus, dried at 110° C., and sifted through a bolting cloth sieve, into a 250-cc. flask. Add 50 cc. of the solvent containing 0.1, 0.2 or 0.3 Gm. of iodine. Place in constant temperature bath and agitate the contents every ten minutes until equilibrium has been established. This is shown by drawing off 10 cc. of the supernatant liquid and titrating the residual iodine with $N/50$ sodium thiosulphate solution at intervals until a constant quantity is found to be present. Then, in an aliquot part of the solvent the residual iodine is again estimated with $N/50$ $Na_2S_2O_3$ solution and by difference the quantity adsorbed can be calculated.

The following table shows the solubilities of iodine at two different temperatures, determined by saturating the solvents with iodine and titrating the iodine in a weighed quantity of the solution with $N/50$ sodium thiosulphate solution.

ADSORPTION OF IODINE BY RED PHOSPHORUS FROM ORGANIC SOLVENTS.

Solvent conc. in 50 cc.	Gm. adsorbed per gram phosphorus, 30° C.	50° C.	Moles adsorbed per gram phosphorus, 30° C.	50° C.
Xylene				
0.3	0.2505	0.2696	9.87×10^{-4}	10.6×10^{-4}
0.2	0.1543	0.1776	6.06×10^{-4}	7.01×10^{-4}
0.1	0.0650	0.0845	2.56×10^{-4}	3.33×10^{-4}
Toluene				
0.3	0.2623	0.2669	10.3×10^{-4}	10.5×10^{-4}
0.2	0.1533	0.1830	6.02×10^{-4}	7.21×10^{-4}
0.1	0.0666	0.0783	2.62×10^{-4}	3.08×10^{-4}
Benzene				
0.3	0.2400	0.1883	9.45×10^{-4}	7.4×10^{-4}
0.2	0.1471	0.1305	5.79×10^{-4}	5.12×10^{-4}
0.1	0.0633	0.0691	2.49×10^{-4}	2.72×10^{-4}
Chloroform				
0.3	0.2010	0.1670	7.91×10^{-4}	6.57×10^{-4}
0.2	0.1387	0.1043	5.47×10^{-4}	4.09×10^{-4}
0.1	0.0785	0.06305	3.15×10^{-4}	2.48×10^{-4}
Carbon tetrachloride				
0.3	0.2770	0.2870	10.9×10^{-4}	11.3×10^{-4}
0.2	0.1864	0.1864	7.32×10^{-4}	7.32×10^{-4}
0.1	0.0940	0.0940	3.7×10^{-4}	3.7×10^{-4}
Carbon disulphide		45° C.		45° C.
0.3	0.2672	0.2878	10.5×10^{-4}	11.3×10^{-4}
0.2	0.1852	0.1897	7.28×10^{-4}	7.48×10^{-4}
0.1	0.0884	0.0914	3.48×10^{-4}	3.59×10^{-4}

MOLAR SOLUBILITIES OF IODINE AT 30° C.

1 mole I_2 dissolves in 12.81 moles xylene
1 mole I_2 dissolves in 15.75 moles toluene
1 mole I_2 dissolves in 18.35 moles benzene
1 mole I_2 dissolves in 64.2 moles chloroform
1 mole I_2 dissolves in 78.7 moles carbon tetrachloride
1 mole I_2 dissolves in 15.2 moles carbon disulphide

AT 50° C. EXCEPTING CS_2 AT 45° C.

1 mole I_2 dissolves in 7.87 moles xylene
1 mole I_2 dissolves in 15.7 moles toluene
1 mole I_2 dissolves in 10.94 moles benzene
1 mole I_2 dissolves in 32.45 moles chloroform
1 mole I_2 dissolves in 35.05 moles carbon tetrachloride
1 mole I_2 dissolves in 9.4 moles carbon disulphide

CONCLUSIONS.

1. When the solvent and adsorbent are free from moisture and there is no chemical reaction between the solvent and solute, adsorption and solubility show an inverse relationship when expressed in moles in the case of iodine, charcoal and the organic solvents.

2. Adsorption data, when compared with solubility, has greater significance when expressed in moles rather than in grams, when a non-electrolyte is adsorbed from solution in a molecular state.

3. When adsorption of iodine with red phosphorus is considered, the absence of moisture is essential for correct results.

SCHOOL OF PHARMACY,
UNIVERSITY OF MARYLAND.

DICHLORAMINE-T AND CHLORCOSANE.

BY BERNARD SALKIN.

1. The keeping of Dichloramine-T without decomposition.
2. The preparation of a pure stable, crystallized Dichloramine-T.
3. "Gas Machine Gasoline" as a diluent for chlorcosane in the preparation of the solution of Dichloramine-T, and also as a "stabilizer" of this solution.

While the Great War cannot very well be called a "blessing in disguise," it is certain that it stimulated advances in science and industry, from which mankind will reap benefits for years to come. In the medical science these advances are especially noticeable. Not only was the technic greatly improved, but certain chemicals were developed which have proved to be valuable therapeutic aids. In one case in particular, that of the Dakin Antiseptics, the raw material—paratoluenesulphonchloride—is a waste product of the manufacture of saccharin.

Much has been written about the antiseptic value of the original Dakin Solution and the Dakin Antiseptics—Chloramine-T and Dichloramine-T; both have proved excellent in military as well as in civil practice.

While, however, they had an extensive use during the war, the Dakin Antiseptics are falling into disuse in civil practice. The reasons for this are manifold:

1. The ordinary practitioner is not sufficiently acquainted with their use.
2. The water-soluble chloramine-T, while it is a most powerful antiseptic, makes a colorless solution having practically no odor. On the other hand tincture of iodine is colored, mercuric bichloride is dispensed in tablets containing a dye, and phenol has a strong odor. This implies efficacy in the mind of the layman.
3. The oil-soluble Dichloramine-T, as usually manufactured, has been found to be unstable both in the powdered form and in solution.
4. Owing to the high viscosity of chlorcosane, the solvent for Dichloramine-T, much difficulty has been experienced in spraying that liquid and made it unsuitable for dispensing.

It has gone so far that one of the largest manufacturers of these products informed me that the utmost is being done to prevent the use of Dichloramine-T because it has been found to be unstable.

The purpose of this article is to show that:

1. Dichloramine-T is a stable chemical, when prepared in a fairly stable form.
2. The solution of Dichloramine-T in chlorcosane (the standard solvent) while necessarily unstable, is not a hindrance to its use.
3. A diluent is proposed, which enables the solution to be easily sprayed by means of an atomizer used for aqueous liquids.

The investigation of Dichloramine-T and its keeping quality was begun when certain dark green (so-called "black") glass bottles, in which the preparation was packed, could not be obtained. Previous investigators had reported that "Dichloramine-T decomposes at the same rate in dark amber and in black glass bottles;" but the rate of decomposition was much greater when the preparation was kept in colorless (flint) glass bottles. (Private communication.) This would tend to show that not only was the compound itself unstable, but its decomposition was hastened by light.

A preliminary study of the problem showed that, when prepared from impure raw materials, the Dichloramine-T tended to decompose rapidly. Only when prepared from paratoluenesulphonamide which had been previously recrystallized, was it possible to obtain a stable product. It was also demonstrated that the correct assay of Dichloramine-T, when freshly prepared, is not a criterion of its quality; some samples quite often decomposed rapidly giving off both chlorine and hydrochloric acid; however, a low assay was always an indication of an inferior product.

A lot of Dichloramine-T was selected which appeared to be stable after having been kept in a sealed container for some time. This lot had been prepared in the factory from a lot of purified paratoluenesulphonamide. The material dissolved to a clear solution—free from residue in both chloroform and chlorcosane.

EXPERIMENTAL.

The Dichloramine-T was put up in 1-ounce dry glass bottles of various colored glass, and stoppered tightly with corks, containing a slip of glazed paper beneath them. The bottles were then placed in a closet with a glass front, so that only diffused light reached them. The temperature was slightly below room temperature of a hot summer, *i. e.*, 25–30° C. The summer having been a particularly humid one, the samples were exposed (when opened for sampling) to the extreme of such weather.

The method used for testing the Dichloramine-T for the "available chlorine" content was as follows:

> Weigh out 0.1000 gram of Dichloramine-T in a 150-mil Erlenmeyer flask. Dissolve in 10 mils of chloroform and stopper the flask with a cork. Add a solution of 3 grams KI in water sufficient to make 10 mils. Shake once, and add 5 mils glacial acetic acid (tested against KI). Allow to stand for 30 minutes in diffused light, shaking occasionally, then add 50 mils of water, shake, and titrate at once, with $N/10$ sodium thiosulphate solution until the yellow color disappears. No indicator is necessary.

Samples of Dichloramine-T were taken from the top of the bottle, then a layer about 0.25 inch thick was removed, and another sample taken.

It was observed that a superficial layer about 0.25 inch thick (in a small bottle) was sufficient to protect the remainder of the Dichloramine-T from the decomposing action of the air.

Results and observations are given in Table 1.

During the course of the investigation, the original stock of standardized volumetric solution of sodium thiosulphate became exhausted, and a new lot was prepared. It was found that while the two volumetric solutions—both checked against pure iodine—checked, when titrated, against pure Dichloramine-T, the same relationship did not exist when a sample of commercial Dichloramine-T was assayed. This is shown in Table 1.

An investigation made in this direction, on available samples, showed that a number of sodium thiosulphate volumetric solutions with the same factor, *e. g.*, F = 1.000, would give different titers for a definite "chlorine equivalent." In one case 16.50 mils, in another 16.60 mils and in an extreme case even 16.80 mils would be required. The error in the determination of the "available chlorine" of the Dichloramine-T would thus amount to as much as 0.6 per cent. in the extreme case.

TABLE 1.

Key: A = Very dark brown ("black") glass bottle. B = Dark green glass bottle.
D = Light amber glass bottle. E = Flint glass bottle.

Note: Figures indicate the number of mils of $N/10$ sodium thiosulphate solution required for 0.1000 gram of Dichloramine-T.

	DATA.									
Date.	"A."	Remarks.	"B."	Remarks.	"C."	Remarks.	"D."	Remarks.	"E."	Remarks.
7/15[1]	16.70		16.70		16.70		16.70		16.70	
7/23[2]	16.60		16.50		...		16.50		16.50	
7/30[3]	16.49		16.52		16.56		...		16.60	
8/6[4]	16.40		16.41		...		16.40		16.42	
8/8[5]	...		...		*16.30		...		...	
* 9/3[6]	16.68		16.58		16.61		16.70		16.92	Slight odor of chlorine
* 9/6[7]	16.79	Slight odor of Cl	16.60	Odor of Cl stronger than "A"	16.72	Practically no odor of Cl	16.75	As in "C"	16.80	Odor of Cl less than above
*10/6[8]	16.76	Faint odor of Cl	16.65	Very strong odor of Cl	16.79	Slight odor of Cl	16.78	As in "C"	16.80	Odor of Cl
*10/7[9]	16.80		16.87		16.79		16.80		16.88	

* In the above determinations there was used a different solution of $N/10$ sodium thiosulphate. See report for explanation of results.

[1] On the day samples were prepared, the weather was rainy and very humid.

[2] Weather as above.

[3] All the samples had a faint odor of chlorine, that of "E" being slightly stronger. Weather as above.

[4] All the samples had a faint odor of Cl. On removing the top layer of Dichloramine-T, the odor of Cl becomes hardly noticeable.

[5] Sample taken from a 2-lb. bottle of dark amber glass which was only one-third full of Dichloramine-T.

[6] Sample taken from surface.

[7] Sample taken after a surface layer about 0.25 inch thick had been removed.

[8] Sample taken from surface.

[9] Sample taken after a surface layer about 0.25 inch thick had been removed.

The bulk stock of Dichloramine-T was usually kept in earthenware crocks with covers which did not fit very tightly. Several times a 2-lb. sample was taken from a crock and put into an amber glass bottle and stoppered with a cork. While the material in the crock would, after a week and in some cases within three days, begin to give off chlorine and hydrochloric acid gas in fairly large quantities and, when dissolved, would give a turbid solution, the Dichloramine-T in the bottle would be as good as when first packed. The latter observations, together with the experiments given in Table 1, indicate that:

1. The opaqueness of the glass of the container is *not* a factor in the keeping quality of a good Dichloramine-T; although dark amber bottles are the best for keeping this material; in case of necessity even flint glass bottles could be used.

2. Dichloramine-T is not affected by diffused light.

3. Air, and especially the moisture of the air, is a very important factor in the decomposition of Dichloramine-T.

4. Dichloramine-T should always be kept in dry, well-stoppered containers which should be filled to the top.

5. A ground-glass stoppered bottle has no advantage over an ordinary cork-stoppered bottle for keeping Dichloramine-T.

RECRYSTALLIZED DICHLORAMINE-T.

A quantity of Dichloramine-T, from the same lot used in the above experiments, was recrystallized from pure carbon tetrachloride. Dichloramine-T is very soluble in carbon tetrachloride, but the latter is an excellent medium for the purpose because it is fully saturated with respect to chlorine, readily volatile, and not readily absorbed by the crystals.

The crystals obtained were small, transparent, and of a pale greenish yellow color. A sample was assayed, and found to have the theoretical value for the chlorine content (29.29 per cent.). The material was put into 2-ounce glass-stoppered, dark amber glass bottles and was left untouched for three months. On opening a bottle, a faintly aromatic odor was noticeable, but there was no trace of HCl or chlorine. The same sample was examined recently, *after it had been kept for four years* in the laboratory. The odor was still aromatic, without any trace of pungency or chlorine. On assaying, the "available chlorine" content was found to be 28.55 per cent., indicating that there was only slight decomposition.

DILUENT FOR CHLORCOSANE.

Before anything is said about the *diluent* for chlorcosane, certain fallacies with regard to chlorcosane and its use as a solvent for Dichloramine-T must be removed.

As is well known, chlorcosane is prepared by running chlorine into molten paraffin until a drop just sinks in water, that is, until a specific gravity of about 1.03 is reached. The brownish yellow oil is washed with water containing sodium carbonate and is then dehydrated. The resultant product is far from being saturated with regard to chlorine and, therefore, when Dichloramine-T is dissolved in it the former, which has a smaller affinity for chlorine than the chlorcosane, readily gives up its chlorine to the latter, and itself breaks down to paratoluenesulphonamide. This has caused the condemnation of Dichloramine-T for medicinal use. However, the important point to be noted is that it is just for this reason—that is, its content of readily available chlorine—that the oil-soluble Dakin Antiseptic is used.

To overcome the disadvantage of the instability of the solution, Dichloramine-T should be dissolved in chlorcosane only when required, which can be done very quickly.

An investigation of the stability of Dichloramine-T in chlorcosane was carried out.

A 2 per cent. solution of uncrystallized Dichloramine-T (called A) and another solution of crystallized Dichloramine-T (called B) were prepared and each put into a 2-oz. cork-stoppered flint glass bottle, which were put in a closet exposed to diffused light. Table 2 shows the results.

TABLE 2.

Time examined.	A.	B.
When prepared	Clear	Clear and bright
After 4 days	Faint odor of HCl. Clear	No odor. Clear and bright
After 13 days	Strong odor of HCl. Clear	Very faint odor. Clear
After 21 days	Strong odor of Cl and HCl. Small crystals present	Very faint odor. Small crystals present
After 23 days	In a cool place for two days. Decomposed	Practically all the solute had crystallized out as the sulphamide. Liquid is mushy. Decomposed

The conclusions to be drawn are, that:

1. Dichloramine-T *does not* form a permanently stable solution when dissolved in ordinary chlorcosane.

2. The purer the Dichloramine-T, the greater the life and stability of the solution.

3. The solution of a pure, *recrystallized* Dichloramine-T in chlorcosane should not be used after it is three days old and, when ordinary Dichloramine-T is used, its solution in chlorocosane should be used on the day it is prepared; that is, a "freshly prepared solution" only should be used.

THE DILUENT.

The chlorcosane having a high viscosity, a special apparatus is necessary in order to spray the heavy oil; this has always been a hindrance to its use. A diluent, which would facilitate the spraying of the solvent, must of necessity have the following properties:

1. A very low viscosity.
2. Must be miscible in all proportions with chlorcosane.
3. Must not be irritating to the mucous membrane.
4. Must not have a disagreeable odor, nor develop one.
5. The diluent must not react with, or affect the stability of, the solution of Dichloramine-T in chlorcosane.
6. The diluent should preferably be readily volatile.
7. Its cost must be low.

Previous investigators had been unable to find a suitable solvent. Having the points enumerated above in view, the author investigated a long list of possible solvents and came to the conclusion that petroleum ether is the ideal liquid for the purpose. Seeking a material which would have all the properties of petroleum ether and be of a lower cost, it was found that "Gas Machine Gasoline" is as good a diluent for chlorcosane as petroleum ether.

An investigation was made of the effect of this diluent on the solution of Dichloramine-T in chlorcosane.

EXPERIMENTAL.

A 2 per cent. solution of Dichloramine-T in chlorcosane was made up and put into a 4-oz. cork-stoppered flint glass bottle, and put into a dark closet at room temperature. This was called "Sample A."

Another 2 per cent. solution of Dichloramine-T was made up, using as a solvent a mixture of four volumes of chlorcosane and one volume of "Gas Machine Gaso-

line." This solution was also put into a 4-oz. cork-stoppered flint glass bottle, and was called "Sample B." It was kept under the same conditions as Sample A.

At various periods about 5 mils of the liquid were withdrawn and assayed for "available chlorine" by the same method as was employed for the Dichloramine-T (*vide supra*). The results are shown in Table 3.

TABLE 3.

	Loss in per cent. of the amount of "available chlorine" present.	
	Sample "A."	Sample "B."
Original solution	..	...
On 9th day	7.1	12.4
On 22nd day	22.0	25.0
On 35th day	32.0	34.0

We can thus see that both solutions lose "available chlorine," but that the loss tends to the same limit in both cases, when the solutions are about one month old.

While the solution which contained the diluent had practically no odor even at the end of one month, the other (chlorcosane only) had acquired an odor of chlorine at the end of one week, and this odor became more pronounced in time.

We can thus see that the diluent has not only the effect of lowering the viscosity of the chlorcosane, but has also the beneficial effect of absorbing the chlorine evolved in the decomposition of the Dichloramine-T.

SUMMARY.

The conclusions to be drawn from the investigation outlined above may be summarized as follows:

1. Dichloramine-T dissolved in chlorcosane is an excellent antiseptic. It is a powerful, non-irritating germicide; possessing the additional advantage of giving off the active ingredient (chlorine) slowly in the amount required.

2. When commercially pure intermediates are used, and a reasonable amount of care is employed in its manufacture, a stable Dichloramine-T is the result. Further purification can be obtained by crystallizing the product from carbon tetrachloride.

3. While chlorcosane is the best solvent for Dichoramine-T, it does not produce a solution which is stable for any great length of time. When this fact is taken into consideration, the preparation leaves little to be desired from the viewpoint of an antiseptic.

4. "Gas Machine Gasoline," when used as a diluent for chlorcosane in dissolving the Dichloramine-T, greatly enhances the value of the preparation for nose and throat work. Its value in private practice is greatly increased, because this solution can easily be sprayed from a suitable atomizer.

5. Only the precautions ordinarily employed in keeping volatile or hydroscopic substances are required for keeping Dichloramine-T. It is the absence of this precaution which has caused this important medicinal product to lose its popularity.

It is to be hoped that the spread of the information hereby presented will cause Dichloramine-T to come back to its own.

1891—48TH ST.,
BROOKLYN, N. Y.

NEW GUAIACOL DERIVATIVES.*[1]

BY LIDA WINKELBLECH.

The experimental results here recorded constitute a part of a study of new remedies and their literature conducted during two academic years since 1919. The work accomplished during the academic year 1919–20 was done under a grant by the Newport Chemical Works of Milwaukee. The work of the academic years 1920 to 1922 was interrupted by sickness that caused a break in the work of a twelve month. This part of the work was supported by a grant from the Research Committee of the American Pharmaceutical Association. The crystalline guaiacol used in the syntheses recorded below was kindly supplied by the Newport Chemical Company. The library investigations on new remedy book literature will be reported separately.

GUAIACYL PHENYL URETHANE.

The preparation of guaiacyl urethane was carried out in four experiments under slightly different conditions with the following results.

In the first experiment 3 grams of liquid guaiacol and 3 grams phenylisocyanate were heated with 30 mils of petroleum, b. p. 179°, for 40 minutes in an acetylization flask over a free flame. While heating, the mixture congealed to a white crystalline mass. After cooling the crystals were collected on a suction filter, washed with petroleum, dried, and then recrystallized first from petroleum and later from alcohol.

Yield = 73%.

M. p. after recrystallization from P. E. = 208–220° C.

M. p. after recrystallization from alcohol = 228° C.

Nitrogen as determined by the Kjeldahl method on the alcohol purified portion = 14.14%.

The above experiment was repeated using the same quantities of reagents but heating only 30 minutes and then allowing the mixture to stand over night. Crystallization took place very slowly, but by concentration in the cold a total yield of 75% was obtained. The product on recrystallization from alcohol showed a wide variation in melting point, *viz.*, from 143° to 226° C. No nitrogen determination was made on this product.

In the third experiment 10 grams of crystalline guaiacol and 9.7 grams of phenylisocyanate were heated with 50 mils of petroleum, b. p. 179° C., for $3^1/_2$ hours. The crystalline product which formed upon cooling was removed and the heating of the mother liquor was continued for 2 hours longer during 4 intervals. After each interval the crystalline product was removed and the melting point taken of each portion which was found to be uniform.

M. p. of crude product = 146° C.

Yield = 81.3%.

The combined portions were recrystallized from alcohol and the melting point was found to be 148° C.

The original mother liquor was then concentrated by distillation and by

* Presented in abstract at Cleveland meeting, A. Ph. A., 1922, Scientific Section.

[1] The expenses of this investigation have been supported in part by a grant from the Research Fund of the American Pharmaceutical Association.

evaporation. A very small quantity of white crystals was obtained which melted at 235° C.

A nitrogen determination was made by the Kjeldahl method on the portion of the product melting at 148° C. with the following results:

Sample No. 1, N = 5.91%.

Sample No. 2, N = 6.60%.

In the fourth experiment the same quantities of reagent were used as in Experiment III. The mixture was heated for 1 hour and then allowed to stand for a period of 10 days. The crystals obtained were collected and purified from alcohol.

Yield = 95.0%.

M. p. of crude product = 146° C.

M. p. after recrystallization = 148° C.

Nitrogen determinations made by the Kjeldahl method showed the following results:

Sample No. 1, N = 5.98%.

Sample No. 2, N = 5.83%.

Three nitrogen determinations were made with the combustion method with the following results:

Sample No. 1, N = 8.69%.

Sample No. 2, N = 6.60%.

Sample No. 3, N = 6.97%.

Guaiacyl phenyl urethane contains 5.76 % nitrogen.

α-NAPTHYL GUAIACYL URETHANE.

The preparation of the α-naphthyl urethane of guaiacol was carried out several times by using equimolecular proportions of the reagents under varying conditions. It will be noticed from the following results that, in the experiments where only a small quantity was prepared, the product obtained consisted of a mixture of substances as will be seen from the variations in melting point as well as in solubility, while in the experiment where a larger quantity was prepared a uniform product was obtained.

In the first experiment 3 grams of crystalline guaiacol and 4.08 grams of α-naphthyl isocyanate were mixed with petroleum ether, b. p. 80–90°, shaken and allowed to stand for several days. The crystalline product obtained was removed by filtration and found to melt at about 270° C. with decomposition.

In attempting to purify the product difficulty was encountered in finding a suitable solvent. Such solvents as ethyl alcohol (95%), ether, chloroform, benzene, xylene, acetone, amyl alcohol, ethyl acetate, heptane and glacial acetic acid were used with relatively slight effects on the substance in question. Absolute alcohol was then used with more favorable results. The substance was boiled in this solvent and a portion removed which melted at 117–118° C. The insoluble portion was then heated in acetone and the product removed therefrom upon crystallization was found to melt at 259° C. The acetone and alcohol-insoluble portions were then dissolved in glacial acetic acid. This product melted at 269° C.

In the second experiment the same quantities of reagents were used but petroleum, b. p., 179–200°, was used for the solvent. The mixture was heated 1 hour. The crystalline product obtained was treated as in the first experiment with identical results.

In the third experiment 10 grams of α-naphthyl isocyanate and 7.3 grams of guaiacol were heated a few minutes in heptane. A uniform product with a melting point of 117° C. and which was completely soluble in 95% ethyl alcohol was obtained.

M. p. after recrystallization = 116–117° C.

A nitrogen determination made by the Kjeldahl method produced the following results:

Sample No. 1, N = 4.76%.

Sample No. 2, N = 4.98%.

GUAIACYL ACETOPHENONE.

The preparation of guaiacyl acetophenone was carried out in four experiments under slightly different conditions which, however, produced similar results. In all cases equimolecular proportions or nearly so of bromacetophenone and potassium guaiacolate were used in heptane as a reaction medium.

In the first experiment 3 grams potassium guaiacolate and 3.9 grams bromacetophenone were mixed with heptane and allowed to stand at room temperature for 3 days. The mixture was then heated to boiling, filtered and allowed to crystallize. The crystals obtained were separated and recrystallized from alcohol.

M. p. of crude product = 101.5° C.

M. p. after recrystallization = 104° C.

In the second experiment 4.1 grams of potassium guaiacolate and 5.0 grams of bromacetophenone were heated in heptane for 40 minutes on a water-bath. The resulting crystals were filtered and recrystallized from alcohol.

M. p. of crude product = 101.5° C.

M. p. after recrystallization = 104° C.

Yield = 57.4%.

In the third experiment 10 grams of bromacetophenone and 8.2 grams potassium guaiacolate in heptane were heated for $^1/_2$ hour on a water-bath. The reaction mixture was allowed to stand over night, then heated another $^1/_2$ hour. The resulting crystals were removed and recrystallized from alcohol.

M. p. of crude product = 102–103° C.

M. p. of recrystallized product 104° C.

Yield = 47.9%.

In the fourth experiment 13.3 grams of bromacetophenone and 11.0 grams of potassium guaiacolate (theoretical amount, 10.84 grams) were allowed to stand for 24 hours in heptane after which the reaction mixture was heated 1 hour, filtered, and the product recrystallized from alcohol.

M. p. of crude product = 92–98° C.

M. p. of recrystallized product = 104° C.

Yield = 54.3%.

In all experiments there was a reddish brown, somewhat oily liquid with a very pungent odor left after the heptane had been recovered by distillation. In the fourth experiment this residue was weighed and found to be approximately 5 grams. This oily liquid and the pungent odor were also very noticeable in the alcoholic mother liquid of the recrystallized product. In the fourth experiment about

1.5 grams of crystals were obtained from this oily residue and dried between filter papers. The melting point of this product lay between 78 to 97° C.

The products of the four experiments were combined, recrystallized from alcohol and found to melt at 104° C. No change in melting point being observed, this product was regarded as pure.

GUAIACYL ACETOPHENONE PHENYL HYDRAZIDE.

One gram of guaiacyl acetophenone and 0.50 gram of phenyl hydrazine were mixed with 25 cc. of alcohol and the mixture warmed on a water-bath. A fluffy yellow crystalline product was obtained which melted from 108–111° C. Upon recrystallization from hot alcohol the melting point dropped to 106–108° C.

GUAIACYL ACETOPHENONE SEMICARBAZONE.

0.8 Gm. of sodium acetate and 0.5 Gm. of semicarbazide hydrochloride were dissolved in the smallest possible quantity of warm water. To this solution 1 gram of guaiacyl acetophenone and sufficient alcohol were added to produce a clear solution when hot. The heating was continued a few minutes longer. The solution was then filtered and the resulting crystals obtained were removed in fractions. There was a great range in the melting point in the same fraction as well as variation in the different fractions. The first fraction showed a range of from 103 to 130° C., while the second fraction melted from 130 to 163°+ C. Each portion was first washed with water and then with ether with the following results:

M. p. of water-insoluble portion = 115–145° C.

M. p. of ether-soluble portion = 103–104° C.

M. p. of ether-insoluble portion = 134–145° C.

It will be noted that the water removed the portion with the melting point of 163°+ which was undoubtedly undecomposed semicarbazide hydrochloride, while the ether removed the portion having the low melting point 103–104° which is the melting point of guaiacyl acetophenone.

A second semicarbizone reaction was carried out using 5 grams of guaiacyl acetophenone with an equimolecular amount of semicarbazide hydrochloride and $1^1/_2$ times as much sodium acetate as semicarbizide under the same conditions as before except that the heating was continued for 4 hours. The resulting crystals were removed in fractions with the following results:

M. p. of 1st crop of crystals = 103–145° C.

M. p. of 2nd crop of crystals = 116–165° C.

The second crop of crystals turned a deep yellow color while the first crop remained white.

Each fraction was washed successively with water and then with ether with the following results:

M. p. of water-insoluble portion, 1st fraction = 134–145° C.

M. p. of water-insoluble portion, 2nd fraction = 103–146° C.

M. p. of ether-insoluble portion, 1st fraction = 148–152° C.

M. p. of ether-insoluble portion, 2nd fraction = 130–158° C.

The products of the semicarbizone reactions were then mixed and recrystallized from alcohol and collected in fractions.

M. p. of 1st fraction = 142–147° C.

QUANTITATIVE DETERMINATION OF IRON IN BASHAM'S MIXTURE.*

BY JOSEPH L. MAYER.

Liquor Ferri et Ammonii Acetatis is frequently submitted to be analyzed for its iron content, and there being no assay method for the preparation in the United States Pharmacopœia nor in other standard reference books consulted, I conducted the following experiments:

(A) Ten cc. of Basham's Mixture were evaporated to dryness and ignited in a platinum dish. Considerable unburned carbon remaining the ash was moistened with concentrated HNO_3, and again ignited. This treatment with nitric acid was repeated several times until it was thought that all the carbon had been burned off. Five cc. of concentrated HCl were then added to the ash and the dish and contents placed on a steam-bath to dissolve the iron oxide. There still being unburnt carbon the acid-soluble material was filtered through an ashless filter paper which after thorough washing was returned to the platinum dish and ignited. The carbon now being consumed there were added to the dish 2 cc. concentrated HCl and the material heated on the steam-bath until dissolved when it was added to the main solution in a bottle with a glass stopper. Two grams of KI were added, the glass-stoppered bottle and contents placed in water at a temperature of 40° C. for 30 minutes, the solution cooled and titrated with $N/10$ $Na_2S_2O_3$ solution employing starch as indicator. The analysis indicated the presence of 0.1561 Gm. iron per 100 cc.

(B) Ten cc. of Basham's Mixture were diluted with about 100 cc. distilled water, ammonium chloride and an excess of NH_4OH added and H_2S passed to saturation. About 10 cc. of ether were added, the material thoroughly stirred while heating on a steam-bath and filtered through a 9 cm. quantitative filter paper (the addition of ether and thorough stirring make the precipitate settle quickly and cause a very rapid filtration), and washed with H_2S water. The precipitate was dissolved in HCl, catching the solution in a 250-cc. Pyrex beaker; the paper was washed thoroughly and the solution boiled to get rid of H_2S, when it was oxidized with HNO_3, the iron precipitated with redistilled NH_4OH; the material was filtered, washed, dried, ignited and weighed as Fe_2O_3. The weight of $Fe_2O_3 \times 0.70 \times 10$ = weight of iron as metallic iron per 100 cc. The analysis indicated the presence of 0.1650 Gm. iron per 100 cc.

To the crucible containing the iron oxide, 5 cc. concentrated HCl were added and the material heated on a steam-bath until solution was complete after which it was transferred to a bottle with a glass stopper, KI added and the analysis completed as under (A). The analysis indicated the presence of 0.1641 Gm. iron per 100 cc.

(C) To 10 cc. of Basham's Mixture in a weighed platinum dish there were added 5 cc. concentrated H_2SO_4, and after evaporating the excess of H_2O on a hot plate, the dish and contents were heated to a dull red heat until SO_2 fumes ceased to be evolved, cooled and weighed. The weight of $Fe_2O_3 \times 0.70 \times 10$ = weight of iron per 100 cc. The analysis indicated the presence of 0.1645 Gm. iron per 100 cc. To the dish containing the iron oxide 5 cc. of concentrated HCl were added and the analysis completed as under the iodometric method in (B). The analysis indicated the presence of 0.1641 Gm. of iron per 100 cc.

(D) Ten cc. of Basham's Mixture were heated in a 500-cc. Kjeldahl flask until excess of moisture was expelled, 20 cc. of a mixture of equal quantities of HNO_3 and H_2SO_4 added and the material heated until all organic matter was destroyed, additional quantities of HNO_3 being added from time to time. When the reaction was complete the material was transferred to a beaker, heated to boiling, made alkaline with NH_4OH to precipitate $Fe(OH)_3$, filtered, washed and dissolved in 5 cc. concentrated HCl, the solution and washings being received in a bottle with a glass stopper, KI added and the analysis completed as under (A). The analysis indicated the presence of 0.1779 Gm. iron per 100 cc.

(E) Ten cc. of Basham's Mixture in a 500-cc. Kjeldahl flask were heated until excess of moisture was expelled, after which 20 cc. concentrated H_2SO_4 and 10 grams K_2SO_4 were added, the material heated until all organic matter was destroyed, transferred to a beaker heated to boil-

* Read before New York Pharmaceutical Association, annual meeting, 1924.

ing, the iron precipitated with NH_4OH, the precipitate washed and dissolved in 5 cc. concentrated HCl, the filtrate and washings being collected in a bottle with a glass stopper, KI added and the analysis completed as under (A). The analysis indicated the presence of 0.1733 Gm. iron per 100 cc.

(F) Following the method I published[1] 10 cc. of Basham's Mixture were diluted with HO_2 *q. s.* 500 cc. Five cc. of this solution were evaporated and ignited in a platinum dish, 5 cc. HCl (1–1) added, the material boiled an instant, poured into a100-cc. Nessler tube, water added *q. s.* 100 cc., 3 drops of $KMnO_4$ solution (5–1000) added to oxidize the iron, and after a few minutes 10 cc. of KSCN solution (20–1000) were added, the color produced being immediately compared with the iron standards. The analysis indicated the presence of 0.160 Gm. iron per 100 cc.

(G) Twenty-five cc. of Basham's Mixture were added to a bottle with a glass stopper, 2 grams of KI and 5 cc. concentrated HCl were added and the material placed in H_2O at 40° C. for 30 minutes when it was cooled and titrated with $N/10$ $Na_2S_2O_3$ solution employing starch as indicator. The analysis indicated the presence of 0.1550 Gm. iron per 100 cc.

The results by all methods were as follows:

A—0.1561 Gm. iron per 100 cc. of Basham's Mixture.
B—0.1641 Gm. iron per 100 cc. of Basham's Mixture.
C—0.1641 Gm. iron per 100 cc. of Basham's Mixture.
D—0.1779 Gm. iron per 100 cc. of Basham's Mixture.
E—0.1733 Gm. iron per 100 cc. of Basham's Mixture.
F—0.1600 Gm. iron per 100 cc. of Basham's Mixture.
G—0.1550 Gm. iron per 100 cc. of Basham's Mixture.

SUMMARY.

1. Due to the large amount of sugar and glycerin which Basham's Mixture contains it is practically impossible to ignite the material without leaving a large amount of carbon which holds iron in such a manner that boiling with HCl does not remove it.

Treatment of the ash by repeatedly moistening it with HNO_3 evaporation and ignition greatly aid but still fail to completely destroy the carbon. If carbon is not entirely consumed the results are low due to the fact that iron is held in such a manner that HCl fails to remove it.

2. Methods D and E give concordant results but are higher than the results of other methods. Notwithstanding the fact that the HNO_3, H_2SO_4 and K_2SO_4 employed in making the analyses were "analyzed chemicals" we tested them and found that they did not contribute to the high results.

Methods A and G yielded practically the same results.

Method F yielded results between those obtained in A, G, B and C; B and C yielded identical results.

3. Method G placing 25 cc. of the sample in a bottle with a glass stopper, adding 5 cc. HCl, 2 grams KI and keeping the material at 40° C. for half an hour, cooling and titrating with $N/10$ $Na_2S_2O_3$, employing starch as indicator, is not only accurate but easily applied and is suggested for inclusion in the U. S. P. X as a method of assay for Iron in "Liquor Ferri et Ammonii Acetatis."

RESEARCH AND ANALYTICAL LABORATORY,
LOUIS K. LIGGETT CO.,
NEW YORK.

[1] "Colorimetric Estimation of Iron in Pharmaceutical Preparations," JOUR. A. PH. A., 5, 517, 1916.

BORON COMPOUNDS OF OXALIC ACID.

BY LEONARD H. CRETCHER* AND FRANK W. HIGHTOWER.†

INTRODUCTION.

In 1702, Homberg[1] isolated boric acid, which he named "sal sedativum" because of its medicinal properties. In the literature since that time there are many references to the use of boric acid and its compounds as sedatives, especially in the treatment of epilepsy; there has been, however, much difference of opinion as to their value. In 1920, Pierre Marie[2] and his co-workers found that potassium borotartrate could be used with considerable success in controlling the convulsions associated with epilepsy.

This laboratory has been engaged for some time in a rather comprehensive study of the preparation and properties of this potassium salt and related substances, with the end in view, firstly, of discovering other compounds even better suited to the purpose, and, secondly, of arriving at knowledge respecting their true constitution.

There has long been a difference of opinion as to the structure of tartar emetic and similar compounds, some chemists believing the antimony (arsenic, boron) to be on the carboxyl group of the tartaric acid, while others have held that the product was formed by reaction of an oxide or acid of the metalloid in question with an hydroxyl group. We were, therefore, interested in preparing compounds in which we were sure of the position of the boryl group and in comparing the properties of these compounds with those of doubtful structure.

In this paper we record the results of attempts to prepare boron compounds of oxalic acid.

It was stated by Duve,[3] in 1869, that boric acid does not combine with oxalic acid. Several years later, Magnanini[4] showed that the electrical conductivity of aqueous solutions of α-hydroxy acids, such as lactic or tartaric, was increased markedly when boric acid was added. He attributed this result to the formation of strongly acid compounds by union of the boric acid with the hydroxy acid. No such increase in conductivity occurred in the case of oxalic acid and it was assumed that in this instance there was no tendency for combination. This conclusion was attested to by Adam,[5] who reported that neither oxalic acid nor its salts combine with boric acid. Werner,[6] while agreeing with the above statements as far as oxalic acid itself is concerned, succeeded in preparing what he thought to be potassium boro-oxalate by boiling a water solution of potassium hydrogen oxalate and boric acid. He considered the compound to have been formed according to the following equation:

$$\begin{matrix} COOK \\ | \\ COOH \end{matrix} + HOBO = \begin{matrix} COOK \\ | \\ COOBO \end{matrix} + H_2O$$

It separated from solution with water of crystallization, the analytical figures

* Senior Fellow of Pure Research, Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh, Pennsylvania.

† Formerly Junior Incumbent of David S. Pratt Fellowship, Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh, Pennsylvania.

indicating the formula $(COOK—COOBO)_2 3H_2O$. The compound is thus described in textbooks.[7]

We have repeated this work and have isolated a compound agreeing in properties to that of Werner but differing somewhat in composition. It is believed the difference in analytical results is due to the fact that we have worked with a purer product than Werner had at his disposal. Microscopic examination of material prepared according to Werner's directions showed it to be composed of two types of crystals.

We have also been able to isolate an analogous and hitherto unknown compound of oxalic and boric acids.

From this experience with these substances we are inclined to disagree with Werner as to the ester-like structure which he has assigned to the so-called potassium boro-oxalate. We feel it more in keeping with the facts to consider this substance, and the free acid corresponding, as double salts. The formulas proposed for these compounds are $KHC_2O_4 . HBO_2 . H_2O$ and $H_2C_2O_4 . HBO_2 . 3H_2O$, or, what is substantially the same thing, namely, $KHC_2O_4 . H_3BO_3$ and $H_2C_2O_4 . H_3BO_3 . 2H_2O$.

EXPERIMENTAL PART.

Potassium Boro-oxalate.—Molecular proportions of ortho-boric acid and potassium hydrogen oxalate were boiled in water solution for one-half hour. On cooling, a mixture of potassium hydrogen oxalate and the boro-oxalate crystallized. The first-mentioned compound is less soluble than the second, and in subsequent experiments the solution was filtered at about 70°, or after crystals of potassium hydrogen oxalate had appeared. In this way most of this substance was removed. The boro-oxalate separating from the filtrate on cooling was recrystallized six times from water. Microscopic examination of the material proved it to be made up of groups of small transparent monoclinic crystals. No other type of crystals could be recognized. It was dried over sulphuric acid and analyzed.

C and H.

0.2275, 0.2030 Gm. substance: 0.1058, 0.0945 Gm. CO_2 and 0.0462, 0.0406 Gm. H_2O.
$C_2H_4O_7BK$. Calculated, C 12.62, H 2.12. Found, C 12.68, 12.69 H 2.27, 2.23

B_2O_3.[*]

0.5264, 0.5344 Gm. substance: 13.42, 13.73 cc. 0.1 *N* NaOH.
$C_2H_4O_7BK$. Calculated, B_2O_3 18.29. Found, B_2O_3 18.22, 18.36.

C_2O_4.

0.4405, 0.3144 Gm. substance: 46.40, 33.17 cc. 0.1 *N* $KMnO_4$.
$C_2H_4O_7BK$. Calculated, C_2O_4 46.27. Found, C_2O_4 46.34, 46.42.

H_2O.

The formulas $COOK.COOBO.2H_2O$ and $COOK.COOH.HBO_2.H_2O$ correspond to the analytical figures for carbon, hydrogen, boron and oxalate and should lose two molecules of water, or 18.95%, if completely dehydrated. Heating in an oven at 120° failed to cause a loss of weight corresponding to two molecules of water. At 140–150° for sixty hours a sample of 1.6728 grams lost 0.3162, or 18.90 per cent. The residual material, on analysis, proved to have retained a small amount of its hydrogen and to be too low in carbon. In other words, it was de-

[*] Boron was determined by heating the substance in a platinum crucible in the presence of an excess of potassium carbonate until all organic matter was oxidized. From this point the procedure was essentially that outlined by Wherry and Chapin.[8]

composed by heat before losing completely the elements of water. We consider the very gradual loss of weight as corresponding, for the most part, to the dehydration of metaboric acid to form pyroboric acid. It is well known that this change takes place very slowly at this temperature.

Potassium boro-oxalate is soluble in water and insoluble in the common organic solvents. It is possible, however, to completely remove the boron in the compound by stirring for some time with cold 95% alcohol. The material remaining insoluble was analyzed and found to be potassium hydrogen oxalate.

The substance titrates as a dibasic acid. Using phenolphthalein as indicator, a little more than half the theoretical amount of standard NaOH is required to give an end-point. On addition of mannite, the solution again becomes acid, the amount of alkali required for complete neutralization corresponding closely to the calculated amount. This behavior, as well as the alcohol extraction and very gradual loss on heating, agrees well with the assumption that the substance is a double salt.

Werner reports that there is no immediate precipitation when barium chloride is added to a cold, strong solution of potassium boro-oxalate, but that a precipitate rapidly forms on warming. We have found that no precipitation takes place at once, in the cold, but that, after a short time, solid does separate from solution and without the aid of heat. This fact cannot be taken as evidence for an ester structure, as a similar time interval has been observed between the addition of a barium chloride solution to a concentrated solution of sodium or potassium hydrogen oxalate and the precipitation of barium oxalate.

Boro-oxalic Acid.—This substance was prepared by dissolving 207 grams of oxalic acid and 104 grams of boric acid in 300 cc. of water and gently boiling for thirty minutes. The solution was cooled in an ice-bath, the crystals filtered off and dried by suction. They were recrystallized seven times from water and dried over calcium chloride. Under the microscope, but one type of crystals could be recognized, these being long, slender, transparent hexagonal prisms, melting at 90°. The material was analyzed with the following results:

C and H.
0.3095 Gm. substance: 0.1434 Gm. CO_2 and 0.1370 Gm. H_2O.
$C_2H_9O_9B$. Calculated, C 12.75, H 4.78. Found, C 12.63, H 4.95.

B_2O_3.
0.5424, 0.5134 Gm. substance: 29.09, 27.55 cc. 0.1 *N* NaOH.
$C_2H_9O_9B$. Calculated, B_2O_3 18.61. Found, B_2O_3 18.73, 18.78.

C_2O_4.
0.4018, 0.5094 Gm. substance: 42.06, 53.73 cc. 0.1 *N* $KMnO_4$.
$C_2H_9O_9B$. Calculated, C_2O_4 46.78. Found, C_2O_4 46.40, 46.43.

H_2O.

On being heated to 100–110°, boro-oxalic acid loses weight beyond the loss required to correspond to $4H_2O$, which we attribute to loss of oxalic acid. This is confirmed by the fact that the residual material analyzes too low for carbon and too high for boron in $COOH.COOH.HBO_2$ or COOH.COOBO. This behavior accords better for the double salt formula $COOH.COOH.HBO_2.3H_2O$ than for the ester formula $COOH.COOBO.4H_2O$.

When barium chloride is added to a saturated solution of this compound in water, there is no precipitation for some time. However, after standing a while, a heavy precipitate appears. This is exactly the behavior we have observed where $BaCl_2$ is added to a strong solution of oxalic acid.

In the presence of mannite the compound titrates as a tri-basic acid.

Di-potassium Boro-oxalate.—Evidence of compound formation was obtained when di-potassium oxalate was heated with ortho-boric acid under the conditions described above. The product upon careful examination appeared to be homogeneous so far as crystalline form was concerned. On being heated at 110–120° for many hours, no loss of weight occurred as would have been the case had the material been merely a mixture of the original components, due both to loss of water of crystallization on the part of the potassium oxalate and the change of ortho-boric to meta-boric acid.

Several analyses were made and results were obtained indicating a formula, $K_2C_2O_4 . HBO_3$. On repeated recrystallizations the analytical figures varied to such an extent that the study of the substance was discontinued as not being justified by its interest or importance to the problem in hand.

SUMMARY.

1. A compound has been prepared from potassium hydrogen oxalate and boric acid, and has been found to possess a different composition than that previously recorded in the literature.

2. A compound of boric acid and oxalic acid ($H_2C_2O_4 . H_3BO_3 . 2H_2O$) hitherto undescribed has been isolated and analyzed.

3. There appears to be no evidence to justify assigning an ester structure to these compounds.

BIBLIOGRAPHY.

1. Homberg, *Crells's Chem. Archiv.*, 2, 265.
2. Pierre Marie, Crouzon and Bouttier, *La Presse Medicale*, 1920, lxxiii, 713.
3. Duve, *Jahresber. Chem.*, 1869, xxii, 540.
4. G. Magnanini, *Gazz. chim. ital.*, 1891, xxi, 215; 1893, xxiii, 197.
5. P. Adam, *Compt. rend.*, 1894, cxviii, 1273.
6. E. A. Werner, *J. Chem. Soc.*, 1904, lxxxv, 1449.
7. For example, see "Text-Book of Inorganic Chemistry" (series edited by J. Newton Friend), Vol. IV, by H. F. V. Little, p. 35.
8. E. T. Wherry and Wm. H. Chapin, *J. Am. Chem. Soc.*, 1908, xxx, 1688.

MELLON INSTITUTE OF INDUSTRIAL RESEARCH,
UNIVERSITY OF PITTSBURGH,
PITTSBURGH, PENNSYLVANIA,
APRIL 14, 1924.

CALCIUM SULPHIDE AS A CHEMICAL ANTIDOTE IN POISONING BY MERCURIC CHLORIDE.

In the *Journal of Laboratory and Clinical Medicine*, in 1917, a recovery was reported of mercuric chloride poisoning, following the administration of calcium sulphide as an antidote. In a more recent paper a number of cases of successful treatment were reported—to the extent that the statement is made in this paper (January 1923, *Hospital Corps Supplement* to the *U. S. Naval Medical Bulletin*) that "cases so treated (by mouth or intravenously) usually show an uneventful recovery." Experiments with rabbits reported in the aforenamed publication, for May, by Lt. J. M. McCants, are not so encouraging; in fact, an amount equal to that employed as antidote of calcium suphide produced death and, also, rabbits actually given mercuric chloride and then the antidote died more quickly than those only given the mercuric chloride. The author suggests that method of treatment may be at fault, possibly the purity of the sulphide. The experiments, however, indicate that further investigation is necessary to establish a reasonable reliability for the calcium sulphide treatment.

NOTES ON THE IRON-GREENING FACTOR OF DIGITALIS.*

BY JOSIAH C. AND BERTHA L.DEG. PEACOCK.

The United States Pharmacopœia restricts the use of the name digitalis to the dried leaves of *Digitalis purpurea*, which is the material referred to in these notes.

The physiological effect of digitalis is both known and understood, but no such fortunate circumstance exists for its constituents; instead, the very opposite state of affairs prevails, and with scarcely any other drug of equally recognized value is there so much confusion.

For a century, digitalis has been the subject of numerous investigations. The reports of the earlier workers pertain chiefly to the active principles, which are commonly designated as glucosides, but are made confusing by an indiscriminate use of names.

The reason for variation in the several proposed educts has long been known; Maisch summed it up in the words—"The behavior to solvents is more or less altered by the presence of other principles."

For a time, the hopelessness of separating the active substances cast some doubt on the future usefulness of the drug, but the advent of physiological assay methods has not only saved digitalis from threatening discard but actually given it a definite value; and the United States Pharmacopœia now requires the drug and its preparations to be standardized by means of such methods.

It was natural that attention should first be given to the active ingredients; but, though much effort has been expended on the separation of these principles, comparatively little regard has been paid to the nature of the inactive constituents. Therefore, while the works of reference abound in descriptions of the active principles, but casual consideration has been given to others.

Some later workers have devoted their efforts to the production of preparations of digitalis which, while representing the activity of the drug, should contain a minimum of inactive matter. Such products are especially desirable for hypodermic use. It is evident that the improvement of this class of preparations depends largely upon a knowledge of the inactive constituents. The slight importance accorded these principles is shown by the mere listing of their names; for instance, one author after much explanation of active constituents says, "other usual constituents of plants, as tannic acid, volatile oil, coloring matter, starch, sugar, gum, salts."

Allen states "the other constituents of digitalis are not characteristic. They include chlorophyl, mucilage, albuminous matter, various salts and inosite." Besides these inactive substances, other authors mention "extractive, resin, pectin, volatile oil, fixed oil, vegetable acids (both fixed and volatile), lignin and mineral matter." Two coloring principles, besides the chlorophyl so evidently present, are described as "red" and "yellow;" the former as analogous to extractive, the latter as "resembling chrysophan, a glucoside found in rhubarb." An "oxydase ferment" ascribed to the recently dried leaves completes the list of plant principles for digitalis.

It will be noted that the presence of vegetable acids has been commonly

* Presented to Pennsylvania Pharmaceutical Association, Bethlehem meeting, 1924.

stated, and they have been repeatedly separated as crystalline substances, although vaguely described and named.

In 1834, W. J. Wilding (*Amer. Jour. Pharm.*) concluded from experiments upon the leaves that they contain gallic acid, mucilage and reddish brown coloring matter, soluble in water, insoluble in alcohol or ether. He found that "digitalis imparts its peculiar properties to cold or hot alcohol, and to boiling water; the decoction or infusion reddens litmus paper, and is precipitated by salts of iron, of a black color, etc." "The nitric, hydrochloric and sulphuric acids also produce precipitates." "Alcohol added to the decoction renders it of almost jelly-like consistence, probably owing to the mucilage it contains."

These remarks of Wilding appear to be the first recorded mention of the behavior of the constituents of digitalis toward iron compounds. But Wilding only inferred the presence of gallic acid from this reaction, he did not isolate it. That this behavior toward ferric salts was or was not due to a tannin seems to have had little import until Githens published his "Studies on the Pharmacology of Digitalis Bodies" in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION for November 1920. He there states that his efforts were purposely and primarily concerning the active constituents; his interest in other constituents was only that involved in separating the active from the inactive matter.

In treating of these inactive components, he said that "in addition to the active glucosides, the leaf contains a very large amount of tannin, constituting, in water and dilute alcohol extracts, the largest part of the solids, and amounting to as much as 16 to 20 per cent. of the weight of the dried leaf." "The tannin is of great importance in helping to cause the bad taste and nauseating properties of the crude drug." "Besides the tannin, the only other inactive component of great importance is the saponin fraction."

To give an insight into the physical and chemical properties of the substance with which he dealt, we quote further from his article—"The marc left after extracting the leaf with chloroform was treated with many different menstrua, chiefly various dilutions of alcohol, in an attempt to determine which extractive was best suited to remove the residual activity." "It was found that the amount of active matter was identical in extracts made with any percentage of alcohol from water to 75%, but that if stronger alcohol were used, extraction was apt to be incomplete." "The total amount of solids removed was fairly constant with all dilutions until concentrations above 75% were reached. Thus from the same lot of leaf, 5% alcohol removed 425 grams of solids per kilo; 75% removed 430 grams; while 95% removed only 125 grams. The difference in the amount of solids is mainly due to the tannins which are not soluble in strong alcohol, and can be precipitated from extracts containing them, by merely increasing the percentage of alcohol."

It was this last statement, together with the one on the amount of tannin, which aroused special interest. The matter was discussed with Dr. Githens, who said that his estimation was based on the amount of a precipitate thrown out of water solution upon the addition of several volumes of 95% alcohol, and that this precipitate, when redissolved in water, showed a green color with ferric chloride. Thus attributing this reaction to tannin, he used the term merely to tell of this material in contrast with the active ingredients with which alone he was concerned,

and without intention to definitely designate the precipitated matter as tannin. Therefore, to the term as used by him, he attached no other significance than that of the iron-greening behavior of this constituent.

Dr. Githens welcomed further consideration of the subject and expressed the hope that effort would be made to isolate and purify the iron-greening factor. Accordingly this was undertaken.

In contemplating the likely occurrence of tannin in digitalis, certain facts of practical value are particularly worthy of review. For instance, while every plant material which contains tannin has not been listed as a source of this agent, still there are few drugs as well known as digitalis that have not been thus indexed if they show even a few per cent. of astringent principle, so little as 5% attracting attention. But, though the reaction of infusion of digitalis with iron salts has long been known, the drug is not found in such lists of plant substances; which is not at all strange because neither the taste of the leaf when chewed nor that of its infusion suggests astringency. The United States Pharmacopœia, without further comment, describes the taste of digitalis as strongly bitter. Nor is there any qualification of this property by other authorities, except that some refer to the bitterness as nauseating. However there is, at times, a sensation of benumbedness experienced from tasting strong decoctions, which might be fancied as astringency almost completely masked by bitterness.

Also, it may well be recalled that solubility in alcohol has been noted as a constant character of the tannins, even of those insoluble in water; for which reason, the tannins are not regarded as precipitable from water solutions by addition of alcohol in any amount.

But since some very unexpected results have been realized while working with tannins, surprises may well be expected; and, during the last few years, experience has shown that not even taste can be depended upon as a guide, for the tannins of red rose petals and wild cherry bark are examples of these principles which are bitter as well as astringent. Experience has clearly revealed the need to isolate and purify every such plant principle as the way to an understanding of its behavior in galenicals.

A number of preliminary experiments were made, during which the presence of an iron-greening constituent was abundantly demonstrated.

Extractions of the leaf with both hot and cold water and with different dilutions of alcohol substantiated the statement of Githens with reference to the extent of solvent action of varying percentages of alcohol, but did not show the iron-greening factor to be insoluble in official alcohol. The precipitating effect of strong alcohol on aqueous and weak alcoholic extractions was also confirmed, but it was found upon washing the precipitate with alcohol, dissolving in water and reprecipitating with alcohol, that the precipitated matter gradually lost its iron-greening effect. Whitish or rusty-looking gelatinous precipitates are produced by acetone just as by alcohol.

Estimations of the "tanning value" of digitalis were made by use of the "hide-powder" method. The hot water infusion of one lot of drug showed 23.33 per cent. and that of another lot 26.66 per cent. A cold water infusion of the latter lot gave figures to indicate 30 per cent. The solids removed by hide represented from about two-thirds to three-quarters of the total soluble solids.

The effect of the rasped raw hide on these infusions was remarkable. Originally, dark colored, with heavy odor, strongly acid to litmus, very bitter and giving much dark green color with ferric chloride, contact with hide powder for a few hours, followed by straining and filtration, showed that all but traces of color, odor, acidity, bitterness and iron-greening effect had been absorbed. When the liquid was again treated with hide powder and again expressed from it and filtered, it was found to have lost all color reaction to ferric chloride. This behavior distinctly proves the absence of gallic acid; conditions to detect which were here proved as proper by control of test.

So far as removal of acidity by hide is concerned, comparisons by actual titration indicated that as much as 95% of the original acidity had been withdrawn from the liquid. In some instances the hide-treated solutions gave precipitates with lead acetate, with others this did not occur or was but slight. Under the influence of hide, the behaviors of hot and cold water infusions were little, if any, different. By fractional application of the hide, it was found that the absorption of the several properties is gradual. Infusions of digitalis may or may not precipitate gelatin solution; the addition of acetic acid, which has been found to facilitate such precipitation with some tannin materials, was not uniformly dependable with these infusions.

The large amount of solids absorbed by the hide led to the adoption of half-kilo quantities of the drug for extraction with the several solvents which were decided upon for trial in methods that have been successfully employed for isolating and purifying tannins.

One such portion was exhausted with cold water, a second with boiling water, a third with chloroform and then with acetone, a fourth with acetone only, and a fifth with acetic ether. Chloroform removed about 3.88 per cent. of dark green, fatty or oily extractive. Acetone, applied thereafter, took out about the same amount of solids. While this extractive contained chlorophyl, it was of a very different texture from that of the chloroform extractive. The acetone extractive yielded little to ether, but was completely soluble in acetic ether, and largely soluble in water.

Every one of the foregoing named solvents removed from digitalis the cause of the iron-greening reaction. But upon the following out of the usual plan of treating the extracted matter with water, shaking out with acetic ether, and purifying the substance so removed by trituration with ether and chloroform, only a trifling amount of the half-kilo of material started with was found to have followed through. During these experiments it was learned that neither acetic ether, ether nor chloroform completely washed out the iron-greening factor from water solution. All of these solvents removed some of the substance, acetic ether extracting it more readily than ether, chloroform less readily. Consequently all phases of the drug material gave the characteristic reaction with ferric chloride. In the substance removed there was much of a white crystalline acid principle that tenaciously accompanied the slight amount of matter which followed through the above outlined process. The final product from half-kilo portions of the drug had a light straw color, but was little more than a few blotches on the glass of the flask in which it was recovered from solution in acetic ether or alcohol.

The relatively larger amount of solids absorbed by hide made this result all the more peculiar.

The several half-kilo portions having failed to give an appreciable yield, 4 kilos of ground digitalis were percolated with acetone until exhausted. The extractive from this lot amounted to about 6.66%. It apparently contained the greater part, if not all, of what chloroform removes from the drug.

This treatment with acetone took out much of the iron-greening factor, but not all of it. It had been found by preliminary experiments that acetone, like alcohol, has a precipitating effect upon certain of the constituents; therefore, as with alcohol, it is reasonable to infer that acetone, too, fails to completely extract that fraction of the iron-greening factor which is thereby enveloped and retained by the marc. This indeed is the explanation of the smaller amount of extractive by strong alcohol, but which extractive contains abundance of the iron-greening factor.

After the marc from the acetone extraction had been deprived of adhering solvent, a portion of it was treated with cold water. Six successively applied lots, each followed by expression, practically accomplished exhaustion of this material in so far as color, taste, acidity and iron-greening reaction served as guides. The several watery solutions showed these features in gradual diminution from the first with much color, odor, acidity, bitterness and iron reaction down to an almost complete absence of these properties. These liquids were mixed and evaporated to about twice the original drug volume, then mixed with six volumes of acetone, which produced a decided turbidity due to a precipitate which gradually settled into a reddish amber, viscid, gum-like sediment. The liquid retained its original dark amber color. Next, the marc was boiled with water, which treatment also removed soluble solids, but much less than those by cold water. The hot water extractions were concentrated and mixed with acetone as was the cold water treatment. It, too, yielded a viscid sediment similar to that from the cold water analogue, but less.

An examination of these viscid precipitates and of the liquids in which they were produced, showed that the iron-greening substance tended to remain in solution rather than to precipitate with acetone. It is therefore in the precipitate by inclusion and not because of insolubility.

These gum-like precipitates were insoluble in acetic ether and alcohol, but readily soluble in water, which solution yielded nothing of account to acetic ether. Neither the water solutions of these substances nor the original water extractions from which they were obtained, showed any change in color with iodine test solution.

Returning to a consideration of the acetone extractive, this substance was treated with chloroform, which took up the greater part of the chlorophyl and left a reddish brown, plastic mass. This was freed of chloroform by warming and then treated with water in which it was almost entirely soluble. The solution had a dark amber color, was very bitter, strongly acid to litmus and reacted abundantly green with ferric chloride. The water solution, clarified by aid of paper pulp, was shaken with acetic ether which removed considerable amount of reddish amber, semi-solid matter, as shown upon recovery of solvent. When this residue became cool, crystalline substance was plainly discernible in the mass. It was noted that the later portions of the acetic ether were removing proportionately more of the crystalline matter than of other substances. By recrystallizing the matter taken

out by further application of acetic ether, using this same solvent for the process, pure white crystals of an acid principle were finally obtained. When the crystals of this acid are untinged with yellow, they do not give a green color with iron solution, but do precipitate lead acetate of a canary-yellow. When free from yellow color, these crystals are sour but not bitter.

The material taken out of the water solution by acetic ether, and left as a mixture of crystalline and non-crystalline matter, was treated with several successive lots of ether, which gradually took away some of the crystalline matter as also a yellow substance which seemed to be amorphous. But the removal of these substances appeared to progress only to a certain point and there stop, after which re-solution in water and again shaking out with acetic ether had the effect of again inducing ether to remove additional yellow color, but little of the crystalline matter. Chloroform was serviceable in the first few repetitions of this water treatment, by removing green and yellow coloring matter; thereafter it was without effect.

In the early stages of this treatment of the acetone extractive, some considerable amount of a somewhat porous residue, in appearance very much resembling a tannin, was left upon evaporating, *in vacuo*, the acetic ether with which this substance had been taken from water solution. But the next application of water showed the greater part of this residue to be insoluble.

To guard against loss here of tannin insoluble in water, like that found in matè, the insoluble portion was at once taken into acetic ether solution, reobtained by distilling off the solvent, and subjected to repeated treatment with ether and chloroform. These solvents continued to remove small amounts of soluble matter, until the mass was again mostly soluble in water. To further protect against loss of tannin of this peculiar nature, all water-insoluble residues were checked up by similar treatment. These formations were mainly of fatty, waxy, chlorophyl and resinous substances. The care that was taken throughout the process warrants the belief that no substance of the usual tannin nature was anywhere lost or set aside. The chloroform-soluble part of the acetone extractive was worked through the process for tannin; it showed nothing of such nature beyond small amounts of the iron-greening factor.

Finally, by the process outlined, an almost colorless product, that appeared to be little if any changed by further use of solvents, was had. The tendency to form a porous residue upon evaporation of solvent had by this time much diminished; still there was such tendency left in the product, though when the liquid was approaching dryness and there was for a moment a froth-like formation at the edge of the liquid which spread into the area of the residue as evaporation went on, there was a change in appearance as the last few drops of solvent were vaporized, the mass coalescing into a pellucid-punctate, straw-colored film upon the flask.

Although this educt gives the characteristic reaction with ferric chloride, and has withstood all attempts to further purify it, it is not regarded as a single substance. It contains crystalline substance, which at times has been unmistakably visible.

A second lot of 4 kilos of digitalis was exhausted with acetone, and the solids thus removed treated at once with water, without the intervention of chloroform. The experience with this lot was but little different from that had from the previous method. The interferences and outcome were about the same.

With the thought of excluding some of the substances which proved to be insoluble in water, a third lot of 4 kilos of the drug was exhausted with hot water; the decoctions were mixed, concentrated, cooled, strained and shaken with acetic ether. Separated and evaporated, this solvent left a reddish amber semi-fluid residue, that, upon treatment with ether, chloroform, acetic ether and water as customarily used for the purpose, gave an educt identical in appearance and other general properties with those from the acetone extractions.

Since similar results were had by operating on kilo lots of the drug with cold water, it would seem that boiling the solution of the soluble solids does not influence the final product.

Dialysis was turned to as a possible means of isolation and purification. Some very concentrated decoction was placed in an animal parchment bag and this suspended in sufficient water to submerge the entire bulk of contents. It was soon demonstrated that the yellow color, the bitterness, the acidity and the iron-greening substance were passing through the membrane. The water was frequently changed. Eventually the osmosis was complete, all bitterness and all iron-greening reaction having passed through, and only the slightest herbaceous taste, without suggestion of astringency, was left in the liquid remaining within the septum. This experiment was made several times, with the same result. This was found to be the case with the isolated material as well as with the decoction. Being flatly contradictory to the effect of hide-powder, this experience with the dialysis of solutions of the iron-greening factor becomes intensely interesting.

The educts from the several methods of isolation and purification gave the characteristic iron-greening reaction. They were all sparingly or slowly soluble in cold water, more readily in hot; the solutions displayed amber colors, possessed very bitter tastes, had strong acid reactions to litmus. Their solutions were precipitated by lead acetate, and by gelatin. Hide-powder removed all of these attributes, except a slight taste and some greatly reduced precipitating effect with lead acetate. They were soluble in alcohol and acetone; insoluble in ether and chloroform. They were dialyzable from pure water solutions just as from decoctions. The substances dissolved in alkalies (ammonium, potassium and calcium hydrates) with production of deep yellow colors. These solutions were rendered colorless by acidification; there was also precipitation during this change.

If this educt is regarded as a tannin it is a most unusual one. The chief point in evidence that this iron-greening principle might be a tannin is the fact that hide-powder completely absorbs it and that it precipitates gelatin—two properties, at present, authenticated to all tannins, but which, in the light of the equally patent fact that this iron-greening factor passes through animal membrane, need to be better understood before the presence of tannin in digitalis or its absence therefrom can be conclusively decided.

To summarize results, it may be said that:

The matter precipitated by alcohol is not responsible for the iron-greening behavior; it merely envelops some of the cause of this. The iron-greening factor is soluble in 95% alcohol.

Digitalis contains colorless, bitterless, crystalline acid substance which gives no change in color with ferric chloride.

Digitalis does not contain gallic acid, gallotannic acid or tannins like those found in oak bark, pecan nut, red rose, matè or wild cherry.

While the iron-greening factor is completely absorbed by hide-powder, it is equally capable of passing through animal membrane; which contradictory behaviors at once raise that continually recurring enigmatic question—What is a tannin?

To avoid adding to the existing confusion, it is suggested that, until more is known of this anomalous constituent of digitalis, the same be referred to as the iron-greening factor.

THE QUANTITATIVE DETERMINATION OF CAMPHOR IN PHARMACEUTICAL PREPARATIONS.

BY H. VIETH AND E. A. BILHUBER.

Though camphor is used to a considerable extent in the field of medicine there is no dependable method recorded for its quantitative determination in the small amounts in which it occurs in pharmaceutical preparations.

The usual method employed is based upon the degree of rotation of a camphor solution as determined by means of the polariscope. This method, given in the Pharmacopœia, can only be used for the natural dextro-rotatory camphor. Furthermore this method for the determination of camphor is not often practical for the analysis of pharmaceuticals, principally because relatively large amounts of camphor are required while the usual preparations contain but very small quantities. All the added ingredients and inerts that far outweigh the camphor present in most such compounded products detract from the accuracy of the polarization or from the simplicity of its application. The usual camphor preparations, tablets or pills, contain but from 0.05 to 0.1 Gm. camphor and at least 1.0 gram of camphor; that is, 10 cc. of a 10% solution absolutely free from foreign matter, is necessary for an exact polarization determination. More dilute solutions than given above permit too great possibilities of error in the readings. Therefore, this method may well be used for the determination of camphor in the official Spiritus Camphorae but is, in general, impractical for other preparations.

Other methods have been proposed, but have given unsatisfactory results. Thus Fuller gives a method in which he converts the camphor into its oxime with hydroxylamine and then titrates. Gildermeister proposed to determine camphor by oxidation with permanganate. Not only is this method not quantitative, but it requires larger amounts of camphor.

The natural procedure for the determination of camphor in small quantities in pharmaceutical preparations would be to isolate the pure camphor and weigh it as such. In the development of such a method it was found that the rapid volatilization of camphor had to be controlled.

Preliminary trials were made on the rate of evaporation of camphor and it was found that the pure powder loses about 10% in weight daily when exposed to the usual room temperature. It must therefore be weighed in a closed vessel. A solution of 0.5 Gm. camphor in 30 cc. chloroform contained only 0.26 Gm. after it had stood 48 hours in an open vessel at room temperature. Only the slightest trace of

camphor remained upon very careful evaporation of such a solution on the water-bath. Pure ether is the most practical solvent. The presence of oxidizing agents in the ether is shown by the yellow discoloration obtained when shaken with potassium iodide and if present are removed by washing alternately with water and hydrosulphite until the addition of the potassium iodide no longer produces the yellow color. In order to avoid loss through volatilization the ether solution of camphor was placed in a narrow-necked flask and then partially evaporated on a water-bath. Without further application of heat, the remainder of the ether was evaporated in a partial vacuum of about 110 mm. This occurs at so low a temperature that practically no camphor is lost. Care must be taken that no stream of air flows over the camphor. Check results of numerous trials proved that quite accurate determinations of camphor in solution could be obtained by this method. As an example a solution of 0.1 Gm. camphor in 30 cc. purified ether was placed in a 50-cc. narrow-necked flask, evaporated to about one-fifth its original volume on the water-bath and then to dryness under reduced pressure. The weight of camphor found varied from 0.099 to 0.097+ Gm.

The separation of the camphor from other ingredients contained in the usual pharmaceutical preparations or prescription mixtures followed the ordinary chemical methods using differences in solubility in the various media. An example may be in place. A powder consisting of gum arabic and milk sugar with 10% camphor was first ground with a little water and then extracted three times with ether. This solution was washed several times with water, dried over sodium sulphate and the pure camphor-ether solution evaporated as described above.

Camphor in a glyco-gelatin (gellets) base was hard to extract as the camphor was found to be so firmly held in this mass that it could only be extracted with difficulty by its usual solvents. It was to be presumed that only the camphor would be extracted by the ether, but this is not the case, for a considerable quantity of glycerin was found to have been carried into the solution with the camphor. The method found to be most simple and accurate was to digest the gellets in pepsin-hydrochloric acid. For one gellet, said to contain 0.1 Gm. camphor, 20 cc. of 1% hydrochloric acid with 1.2% pepsin—equivalent to about 10 times the strength of the stomach juices—were used. After digesting one hour at 40° C., the camphor was found to be suspended in the liquid in a state of fine subdivision and was readily extracted with ether in either the Soxhlet or by shaking with the solvent. The camphor is not determined by evaporation and weighing as such in accordance with the method developed. A series of analyses of gellets gave an average of 0.102 Gm. camphor as against the theoretical content of 0.1 Gm. The difference between the highest and lowest results was only a few milligrams.

CONCLUSIONS.

The present given methods for the quantitative determination of camphor in pharmaceutical preparations are often impractical and not necessarily accurate.

The method of weighing camphor direct after extraction and evaporation of its ether solution under partial vacuum as described in this paper is practical, rapid and exact.

NEW YORK CITY,
MAY 26, 1924.

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A. G. DuMez, Reporter on the Progress of Pharmacy

All articles recorded in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK, which is issued annually. Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A. G. DuMez, Hygienic Laboratory, U. S. P. H. S., 25th & E Sts., N. W., Washington, D. C.

APPARATUS AND MANIPULATIONS.

Murray, A. G.
Apparatus for the precipitation of barium sulphate
J. AM. PHARM. ASSOC., 13 (1924), 424

Needham, George H.
New method for the preparation of styrax and balsam of Tolu for use as microscopic mounting media
J. AM. PHARM. ASSOC., 13 (1924), 424

Price, N. J., and Hawkins, C. S. L.
New determination of the specific gravities of solutions of ammonia
J. Soc. Chem. Ind., 43 (1924), 113T

PHARMACOPŒIAS AND FORMULARIES.

Anon.
Incompatibilities and the Swiss Pharmacopœia
Schweiz. Apoth.-Ztg., 62 (1924), 286

Anon.
Review of Willmar Schwabe's Homoopathisches Arzneibuch
Pharm. Weekbl., 61 (1924), 507

Kebler, L. F., *et al.*
Report of committee to coöperate with the U. S. P. committee of revision
J. Assoc. Off. Agr. Chem., 7 (1924), 285

Lemeland, Pierre
Report of subcommittee No. 6 of the Revision Committee of the Codex on powders, pulps, medicinal waters and solutions for injection
J. pharm. et chim., 29 (1924), 495

Scholar, Abel
Notes on the British Pharmacopœia
Chem. & Drug., 100 (1924), 655

PHARMACEUTICAL PREPARATIONS.

Anon.
Preparation of tasteless Syrup of Ferrous Iodide
Südd. Apoth.-Ztg., 64 (1924), 182

Bonis, M.
Substitution of orange flower water
Ann. falsif. (1923), 260; through *Repert. pharm.*, 35 (1924), 129

Bosart, L. W.
Soap as a vehicle for medicaments and disinfectants
Chem. Age, New York, 32 (1924), 89

Fromme, J.
Preparation of Solution of Zinc Chloride
Südd. Apoth.-Ztg., 64 (1924), 182

Goris, A., and Métin, M.
Diminution in filicin content of oleoresin of male fern
Bull. sci. pharmacol., 31 (1924), 257

Hofman, J. J.
Compound Ointment of Methyl Salicylate
Pharm. Weekbl., 61 (1924), 499

Karsmark, K. A.
Preparation of Decoction of Senega
Svensk Farm. Tidskr., 28 (1924), 225

Kyser, E. V., and Vilbrandt, Frank C.
Preliminary report on the effect of fatty acids on liniments and emulsions
J. AM. PHARM. ASSOC., 13 (1924), 433

PHARMACOLOGY AND THERAPEUTICS.

Anon.
Medicinal value of Oncoba oils
Bull. Imp. Inst., 21 (1923), 585; through *J. Chem. Ind.*, 43 (1924), B342

Cain, A., and Oury, P.
Pharmacodynamic action of pilocarpine and its rôle in the retention of urine
Presse med. (1923), 897; through *Bull. sci. pharmacol.*, 31 (1924), 315

Gold, Harry
Seat of the mydriatic action of cocaine
J. Pharmacol. & Exp. Therap., 23 (1924), 365

Graf, H.
Relation between chemical constitution and local anesthetic action of *N*-alkylleucinol esters of *p*-aminobenzoic acid
Arch. exp. Pathol. u. Pharm., 99 (1923), 315; through *J. Soc. Chem. Ind.*, 35 (1924), B443

Hanzlik, P. H., and French, W. O.
Pharmacology of Phoradendron flavescens
J. Pharmacol. & Exp. Therap., 23 (1924), 269

Henry, T. A., and Brown, H. C.
Some reputed dysentery remedies
Trans. Roy. Soc. Trop. Med., 17 (1924), 378; through *J. Soc. Chem. Ind.*, 43 (1924), B443

Kochmann, M.
Assay of pituitary preparations and other oxytocics
Ztschr. physiol. Chem., 129 (1923), 95

Lawson, W., *et al.*
Synthesis of apoharmine and of certain carboline and copyrine derivatives
J. Chem. Soc., 125 (1924), 626; through *J. Soc. Chem. Ind.*, 43 (1924), B442

Leuret, F., and Rioux, G.
General anesthesia by intravenous injection of chloral
Compt. rend. soc. biol., 89 (1923), 949; through *Bull. sci. pharmacol.*, 31 (1924), 315

Nelson, Erwin E.
Standard for pituitary extract
J. Am. Pharm. Assoc., 13 (1924), 426

Nishikawa, H., *et al.*
Constitution of certain harmaline derivatives
J. Chem. Soc., 125 (1924), 657; through *J. Soc. Chem. Ind.*, 43 (1924), B442

Penau, H., and Simonnet
Physiological standardization of insulin
J. pharm. et chim., 29 (1924), 473

Riccomanni, C.
Relations between chemical constitution and pepper taste
Atti r. accad. Lincei, 33, 1 (1924), 145; through *J. Soc. Chem. Ind.*, 43 (1924), B443

Serono, C., Trocello, E., and Cruto, A.
Preparation and physiological action of insulin
Rass. Clin. Therap. Sci. Aff., 22 (1923), 243; through *J. Soc. Chem. Ind.*, 43 (1924), B444

Schöbl, O.
Chemotherapeutic experiments with chaulmoogra oil and allied preparations
Philippine J. Sci., 23 (1923), 533; through *J. Soc. Chem. Ind.*, 43 (1924), B342

Shipley, P. G., *et al.*
Antirachitic effect of certain oils
J. Biol. Chem., 59 (1924), 177; through *J. Soc. Chem. Ind.*, 43 (1924), B444

Staudinger, H., and Schneider, H.
Relation between chemical constitution and taste of pepper
Ber. deutsch. chem. Ges., 56B (1923), 699; through *J. pharm. et chim.*, 29 (1924), 422

GENERAL BOTANY AND BACTERIOLOGY.

Brocadet, A. P.
Some little known plants from the Amazon region
Bull. sci. pharmacol., 31 (1924), 281

Chevalier, Aug.
Origin of Indo-Chinese benzoin
Rev. Bot. appli. et d'Agr. col., 29 (1924), 10; through *Bull. sci. pharmacol.*, 31 (1924), 313

Conci, Giulio
Some observations on Ficus carica L.
Boll. chim. farm., 63 (1924), 305

DeGraff, W. C.
Aloe and aloe culture in the West-Indian Islands
Pharm. Weekbl., 61 (1924), 596

Dentz, Fred. Oudschans
Curacao aloes
Pharm. Weekbl., 61 (1924), 626

Dezani, S.
Notes on pharmacognostic practice
Giorn. farm. chim., 73 (1924), 5

DuPlessis, I. P. J.
Chemical investigations of three South African plants
S. African J. Sci., 20 (1923), 256

Duthoit, A.
Antiseptic action of hexamethyleneamine in vitro
Compt. rend. soc. biol., 89 (1923), 56; through *Bull. sci. pharmacol.*, 31 (1924), 316

Henry, Augustine
Larch agaric
Pharm. J., 112 (1924), 439

Himmelbauer, Wolfgang
Recent attempts in growing and collecting drug plants in Europe
Pharm. Monatsh., 5 (1924), 17

Holmes, E. M.
Henna
Pharm. J., 112 (1924), 437

VEGETABLE AND ANIMAL DRUGS.

Anon.
Apium graveolens, L.
J. pharm. d'Alsace Lorraine, 50 (1923), 134; through *Chem. Abstr.*, 69 (1924), 204

Brandt, W.
Evaluation of saponin drugs
Pharm. Ztg., 69 (1924), 204

Cattelain, E.
Analysis of the ash of gelatin
J. pharm. et chim., 29 (1924), 414

Cattelain, E.
Test for gelatin intended for pharmaceutical or bacteriological use
J. pharm. et chim., 29 (1924), 444
Dudley, H. W., and Starling, W. W.
Improvements in the preparation of insulin
Biochem. J., 18 (1924), 147; through *J. Chem. & Ind.*, 43 (1924), B352
Fenger, Frederic, and Wilson, R. S.
Amount of available insulin in the pancreas of domestic animals
J. Biol. Chem., 59 (1924), 83
Moloney, P. J., and Findlay, D. M.
Purification of insulin by adsorption on charcoal and subsequent recovery
J. Phys. Chem., 28 (1924), 402; through *Chem. Abstr.*, 18 (1924), 1730

ALKALOIDS AND GLUCOSIDES.

Brandt, W.
Valuation of saponin drugs
Pharm. Ztg., 69 (1924), 204; through *J. Soc. Chem. Ind.*, 43 (1924), B351
Bridel, M., and Delauney, P.
Properties of loroglossin
J. pharm. et chim., 29 (1924), 393
Fabre, René
Some interesting solvents for difficultly soluble alkaloids
Bull. soc. pharm. Bordeaux, 62 (1924), 68
Feltis, F., and Suppan, A.
Constitution of morphine
Pharm. Monatsh., 4 (1923), 189; through *J. Soc. Chem. Ind.*, 43 (1924), B351
Ishikawa, S., and Takamatsu, K.
Adsorption of alkaloids by Kambara Nendo and its application to the preparation of morphine and natural codeine
J. Pharm. Soc. Japan, 505 (1924), 166; through *Chem. Abstr.*, 18 (1924), 1732
Knapp, A. W., and Wadsworth, R. V.
Distribution of theobromine during the fermentation of cacao
J. Soc. Chem. Ind., 43 (1924), 124T
Koffer, L.
Valuation of saponins as foam-producing materials
Chem.-Ztg., 48 (1924), 165; through *J. Soc. Chem. Ind.*, 43 (1924), B443
Merck, E.
Patented process for synthetic cocaine
Chem. & Drug., 100 (1924), 725
Späth, E., and Prokopp, S.
Galegine
Ber. deutsch. chem. Ges., 57 (1924), 474; through *J. Soc. Chem. Ind.*, 43 (1924), B399

OILS, FATS AND WAXES.

Biazzo, R.
Gravimetric determination of the bromine value of fats
Chem. Zentr., 95 (1924), 2030; through *J. Soc. Chem. Ind.*, 43 (1924), B478
Damoy, Georges
Contribution to a chemical study of beeswax
Bull. sci. pharmacol., 31 (1924), 287
Eibner, A., Merz, O., and Munzert, H.
Tung oil
Chem. Umschau, 31 (1924), 69; through *J. Soc. Chem. Ind.*, 43 (1924), B477
Grun, A., and Halden, W.
Determination of the hydrogen value of unsaturated substances
Ztschr. Deuts. Oel-u. Fettind., 44 (1924), 21; through *J. Soc. Chem. Ind.*, 43 (1924), B431
Margosches, B. M., and Hinner, W.
Mechanism of acid formation in the reaction of iodine on fats
Chem. Umschau, 31 (1924), 41; through *J. Soc. Chem. Ind.*, 43 (1924), B341
Perkins, G. A., and Cruz, A. O.
Comparative study of various oils in the chaulmoogra group
Philippine J. Sci., 23 (1923), 543; through *J. Soc. Chem. Ind.*, 43 (1924), B342
Utz, F.
Methods for the determination of the specific gravity of beeswax
Farben-Ztg., 29 (1924), 645; through *J. Soc. Chem. Ind.*, 43 (1924), B342
Whitby, G. S.
New reaction for the detection of cholesterin
Biochem. J., 17 (1923), 5; through *J. pharm. et chim.*, 29 (1924), 453

ESSENTIAL OILS.

Anon.
Review of the progress in essential oils reported in the Bericht von Schimmel & Co.
Perf. & Ess. Oil Rec., 15 (1924), 151
Boulez, V.
Determination of alcohols in essential oils.
Bull. soc. chim., 35 (1924), 419; through *J. Soc. Chem. Ind.*, 43 (1924), B447
Cash, L. S., and Fawsitt, C. E.
Estimation of cineole in essential oils by the Cocking process
J. Proc. Roy. Soc. N. S. Wales, 57 (1923), 157; through *Chem. Abstr.*, 18 (1924), 1730
Gokhale, S. K., Sudborough, J. J., and Watson, H. E.
Conversion of eugenol into isoeugenol

J. Indian Inst. Sci., 6 (1923), 241; through *J. Soc. Chem. Ind.*, 43 (1924), B447

Johnson, C. W., and Wilkes, Robin
Pacific Coast peppermint
Perf. & Ess. Oil Rev., 15 (1924), 155

Lautier, Charles
Hesperidia oil
Parfum. mod., 17 (1924), 25; through *Chem. Abstr.*, 18 (1924), 1731

Liotta, Peppino
Nepeta cataria oil
Rev. parfumerie, 4 (1924), 10; through *Chem. Abstr.*, 18 (1924), 1731

Moudgill, K. L.
Calamintha umbrosa oil
J. Soc. Chem. Ind., 43 (1924), 163T

Penfold, A. R.
Essential oils of Callistemon lanceolatus and C. viminalis
J. Proc. Roy. Soc. N. S. Wales, 57 (1923), 131; through *Chem. Abstr.*, 18 (1924), 1730

Ruzicka
Recent researches on cadinene and cadinol
Perf. & Ess. Oil Rev., 15 (1924), 152

GENERAL AND PHYSICAL CHEMISTRY.

Aston, F. W.
Atoms and isotopes
J. Soc. Chem. Ind., 43 (1924), 598

Boissière, M.
Rapid methods for determining the titer of the more important volumetric solutions
Bull. soc. pharm. Bordeaux, 62 (1924), 73

Congdon, L. A., and Ray, E. L.
Critical study of methods for the determination of cerium
Chem. News, 128 (1924), 233; through *J. Soc. Chem. Ind.*, 43 (1924), B453

Dufilho, E.
Analytical method for differentiating the arseniates of lead
Bull. soc. pharm. Bordeaux, 62 (1924), 93

Jellinck, K., and Krebs, P.
New methods of quantitative analysis
Ztschr. anorg. Chem., 130 (1923), 263; through *Chem. Abstr.*, 18 (1924), 639

Krepelka, Henry
Revision of the atomic weight of aluminum
J. Am. Chem. Soc., 46 (1924), 1343

Lisievici-Draganescu, A.
Relation between the stabilization of hydrogen peroxide solutions and the modification of surface tension
Bull. Soc. Chim. România, 6 (1924), 42; through *J. Soc. Chem. Ind.*, 43 (1924), B466

Richards, Theodore W.
Internal pressures of solids
J. Am. Chem. Soc., 46 (1924), 1419

Scales, F. M., and Harrison, Arthur P.
Colorimetric determination of nitrogen
Ind. & Eng. Chem., 16 (1924), 571

Scott, Wilfred W.
Diphenylamine indicator in the volumetric determination of iron
J. Am. Chem. Soc., 46 (1924), 1396

Tananaeff, N. A.
Determination of tin and mercury by the spot method
Ztschr. anorg. allgem. Chem., 133 (1924), 372; through *Pharm. Weekbl.*, 61 (1924), 605

INORGANIC CHEMICALS.

Agafonoff, and Vernadsky, W.
Product of the dehydration of kaolin
Compt. rend. acad. sci., 178 (1924), 1082; through *J. Soc. Chem. Ind.*, 43 (1924), B423

Damiens, A.
Spontaneous transformation of yellow iodide of mercury
Compt. rend. acad. sci., 178 (1924), 326; through *Bull. sci. pharmacol.*, 31 (1924), 291

Rao, B. G., Sudborough, J. J., and Watson, H. E.
Refining crude saltpetre
J. Indian Inst. Sci., 6 (1923), 195; through *J. Soc. Chem. Ind.*, 43 (1924), B333

Ross, W. H., Mehring, A. L., and Jones, R. M.
Preparation of phosphoric acid
Ind. & Eng. Chem., 16 (1924), 563

Rupp, E., and Siebler, G.
Bromometric determination of lead peroxide, red lead and manganese dioxide
Chem.-Ztg., 48 (1924), 241; through *J. Soc. Chem. Ind.*, 43 (1924), B466

Schuhmann, Reinhardt
Free energy and heat content of arsenic trioxide
J. Am. Chem. Soc., 46 (1924), 1444

Wagner, E. C.
Evaluation of potassium chlorate by Bunsen's method
Ind. & Eng. Chem., 16 (1924), 616

Wolf, H., and Heymann, E.
New test for nitric acid and nitrates
Ztschr. angew. Chem., 37 (1924), 195; through *J. Soc. Chem. Ind.*, 43 (1924), B465

ORGANIC CHEMICALS.

Adams, Rogers, and Montgomery, Edna
Simplification of the Gattermann synthesis of aromatic aldehydes
J. Am. Chem. Soc., 46 (1924), 1518

Briner, E., *et al.*
Properties of dichlorobutane
Helv. Chim. Acta, 7 (1924), 374; through *J. Soc. Chem. Ind.*, 43 (1924), B399

Charaux, C.
Formation of the glucide, rutinose
Compt. rend. acad. sci., 178 (1924), 1312; through *J. Soc. Chem. Ind.*, 43 (1924), B443

Cretcher, Leonard H., and Pittenger, W. H.
Alkyl esters of ethylene glycol
J. Am. Chem. Soc., 46 (1924), 1503

Dakin, H. D.
Resolution of inactive malic acid into optically active forms
J. Biol. Chem., 59 (1924), 7; through *J. Soc. Chem. Ind.*, 43 (1924), B445

Fischer, W. M., and Schmidt, A.
Determination and separation of methyl alcohol
Ber. deutsch. chem. Ges., 57 (1924), 693; through *J. Soc. Chem. Ind.*, 43 (1924), B446

Fleury, Paul
Value of guaiacol in testing for the activity of an oxidase preparation
J. pharm. et chim., 29 (1924), 402

Fuller, Henry C.
Properties and uses of ethylene glycol
Ind. & Eng. Chem., 16 (1924), 624

Heslinga, J.
New methods for determining chlorine, bromine and iodine in organic compounds
Rec. trav. chim., 43 (1924), 181; through *J. Soc. Chem. Ind.*, 43 (1924), B357

Kebler, L. F., and Kunke, W. F.
Notes on amyl nitrite
J. Am. Pharm. Assoc., 13 (1924), 439

Kling, A., and Lassieur, A.
Detection and estimation of tartaric acid
J. pharm. et chim., 29 (1924), 482

Knecht, Edmund, and Muller, Eric Frank
Dehydration of alcohol by means of glycerin
J. Soc. Chem. Ind., 43 (1924), 177T

Lachman, Arthur
The Beckmann rearrangement
J. Am. Chem. Soc., 46 (1924), 1477

Leffmann, Henry
Microchemical tests for hexamethylenetetramine
Am. J. Pharm., 96 (1924), 366

Luce, E.
Production of acetone by the action of potassium acetate on acetic anhydride
Bull. soc. chim., 35 (1924), 179; through *J. Soc. Chem. Ind.*, 43 (1924), B446

Marcusson, J., and Bottger, F.
Constitution of melene
Ber. deutsch. chem. Ges., 57 (1924), 633; through *J. Soc. Chem. Ind.*, 43 (1924), B457

Maynard, J. L.
Direct mercuration of benzene and the preparation of mercury diphenyl
J. Am. Chem. Soc., 46 (1924), 1510

McVicker, William H., *et al.*
Emission spectra of organic compounds
J. Am. Chem. Soc., 46 (1924), 1351

Palkin, Samuel, and Wales, H.
Identification of phenols by means of the spectroscope
J. Am. Chem. Soc., 46 (1924), 1488

Read, R. R., and Prisley, Frederic
Tertiary butyl alcohol
J. Am. Chem. Soc., 46 (1924), 1512

Sommelet, M.
Preparation of monomethylamine
Compt. rend. acad. sci., 178 (1924), 217; through *Bull. sci. pharmacol.*, 31 (1924), 291

Spath, E., and Jeschki, K.
Constitution of sparassol
Ber. deutsch. chem. Ges., 57 (1924), 471; through *J. Soc. Chem. Ind.*, 43 (1924), B399

Tarugi, N.
Behavior of formaldehyde in the titration of amino-acids
Boll. chim. farm., 63 (1924), 97; through *J. Soc. Chem. Ind.*, 43 (1924), B444

Warren, L. E.
Note on a compound of benzocaine and iodine
Rep. Lab. Am. Med. Assoc., 16 (1923), 97

Yee, J. Y., and Krase
Method for the determination of calcium carbide
J. Am. Chem. Soc., 46 (1924), 1389

CLINICAL AND DIAGNOSTIC METHODS.

Beccadelli, G.
New reaction of blood
Biochem. Ztg., 134 (1922), 180; through *J. pharm. et chim.*, 29 (1924), 427

Guyot, Renè
Rose colored urine produced by medicines
Bull. soc. pharm. Bordeaux, 62 (1924), 97

Moretti, E.
New diagnostic test for typhoid fever
J. pharm. Belg., 6 (1924), 346

CHAIN STORES IN THE UNITED STATES.*

BY CLYDE L. EDDY.

Over-sanguine chairmen of commercial interests committees and others are apt to tell us that the "chain store idea is unsound" and are inclined to point to the occasional failure of a chain store enterprise as proof that the system is "on its last legs" and that the time is near when every store will have its own proprietor and there will be no more buying and selling in chain store quantities. But the facts do not bear these hopeful statisticians out.

The Great Atlantic and Pacific Tea Company, for instance, has about 10,000 stores, 5000 of them having been established since 1921. This means that the company is opening more than 1600 new stores every year, 133 per month, more than four a day. The F. W. Woolworth Company, operating approximately 1200 five-and-ten-cent stores, last year sold to the American public 167 million dollars' worth of goods—at a net profit of more than eighteen million dollars.

The S. S. Kresge Company, operating a chain of 223 stores, selling merchandise at prices ranging from five cents to one dollar, has seen the number of its stores increase four-fold during the last thirteen years and in the same time watched its sales increase from five to sixty-five million dollars per annum—and its net profit, from $310,000 to $7,576,000 per year.

As long ago as 1914 there were 2000 chains of grocery, candy, cigar, drug, department, five-and-ten-cent and other kinds of stores, in each chain of which there were from three to 900 links—or 20,000 stores in all. It is probable that that number has doubled in the last nine years. It is likely that there are upwards of 100,000 chain stores of all kinds in the United States at the present time.

There is no trustworthy sign that chain stores have reached the peak of their development. In nearly all fields they seem, in fact, to be on the up-grade and independent retailers may as well face that fact. We are assured by an authority writing for the United States Chamber of Commerce that "chain organizations are certain to increase and to grow as long as the average manageability of independent store managers is lower than the organized ability of chain organizations and as long as the buying power of chain stores gives them advantage over independent stores."

CHAINS DO SIX PER CENT. OF NATION'S BUSINESS.

According to figures compiled by *The Druggists Circular*, chain drug stores do almost twenty per cent. of the total drug business of the country. Ten per cent. of the total sales in grocery stores are made in chain stores. It is safe to say that six per cent of the total retail business of the country is done in stores owned by chain store organizations.

It is estimated that a billion and a quarter dollars are spent every year in the retail drug stores of the United States. Approximately twenty per cent. of that money is spent in chain drug stores, six per cent. of it in stores owned by the twenty-one largest operators. In other words, twenty of every hundred dollars spent each year in American drug stores are spent in chain drug stores—and as recently as 1900 there were less than fifty such stores throughout the country. There are

* Section on Commercial Interests, A. Ph. A., Asheville meeting, 1923.

at the present time in the United States 2014 chain drug stores operated by 327 companies and individuals.

The following figures show the remarkable growth and the present position of the leading chain stores outside of the drug field:

COMPARATIVE STATISTICS OF SOME LEADING CHAINS.

Table showing increase in stores, sales and net profits.

Stores.

Year.	Woolworth.	Kresge.	Penney.	McCrory.	Kinney.
1912.....	631	85	..	93	37
1913.....	684	101	48	110	40
1914.....	737	118	71	116	43
1915.....	805	140	86	117	46
1916.....	920	157	127	134	53
1917.....	1000	164	177	143	57
1918.....	1039	170	197	147	61
1919.....	1081	176	197	148	64
1920.....	1111	189	297	156	75
1921.....	1137	199	312	159	102
1922.....	1182	212	371	161	120

Sales.

Year	Woolworth.	Kresge.	Penney.	McCrory.	Kinney.
1912.....	$60,557,767	$10,325,487	....	$4,971,120	$2,496,514
1913.....	66,228,072	13,258,227	$2,636,920	5,551,712	2,932,244
1914.....	69,619,669	16,097,393	3,560,293	5,224,692	3,346,845
1915.....	75,995,774	20,943,300	4,825,072	5,641,601	4,524,159
1916.....	87,089,270	26,396,547	8,415,877	6,792,143	6,529,716
1917.....	98,102,857	30,090,700	14,880,965	7,830,775	8,673,012
1918.....	107,179,411	36,309,513	21,336,795	9,608,091	9,764,499
1919.....	119,496,107	42,668,061	28,778,230	11,486,206	11,742,564
1920.....	140,918,981	51,245,311	42,822,564	14,199,346	15,065,297
1921.....	147,654,647	55,859,010	46,641,928	14,406,404	12,249,810
1922.....	167,319,265	65,191,467	49,035,729	17,123,252	12,329,985

Net Profits.

Year.	Woolworth.	Kresge.	Penney.	McCrory.	Kinney.
1912.....	$5,441,798	$ 525,000	....	....	....
1913.....	6,461,118	733,000	$ 333,609	....	....
1914	6,429,895	1,021,000	406,331	....	....
1915.....	7,548,209	1,167,000	559,078	....	....
1916.....	8,713,444	2,024,000	1,069,236	....	$737,792
1917.....	8,020,139	1,720,000	900,467	....	883,103
1918.....	6,156,595	1,560,000	1,695,754	$347,113	867,065
1919.....	10,361,556	2,140,000	1,877,692	464,208	1,483,295
1920.....	9,795,251	2,613,000	355,746	619,484	1,143,264
1921.....	13,792,959	3,260,000	1,254,634	687,771	855,613
1922.....	18,324,398	6,474,000	3,325,720	1,185,069	1,208,963

And so we see no immediate signs of the "breaking down of the chain store system." Chain stores, apparently, are here to stay. With the wish as father to the thought we may think that the limit, in the drug field at least, has been reached but it is folly to ignore the fact that the larger chains in all fields continue to expand from year to year.

Retailers are urged to face the facts, chain store competition is not impossible to meet—even their buying advantage may be overcome by coöperative buying.

The solution to the chain store problem does not lie in hoping for its solution through the happy demise of chain stores but in a thoughtful study of the points in which chain store service excels—and in an earnest effort to give service as good and at as low a price to the public.

WHAT A BIG CITY DRUG STORE HOLDS OUT FOR A RECENT GRADUATE.*

BY CLIFFORD H. RUDES.[1]

The college of pharmacy graduate stands on the threshold of his career in many ways. Being young and unsophisticated he is apt to take the mistaken attitude that, inasmuch as he has completed his college course successfully and has perhaps conquered the state board examination, he is already "made." Such an attitude is by no means criminal, it is simply a grossly mistaken one and pardonable because it is the outgrowth of enthusiastic, confident youth. Nevertheless, the sooner the college graduate comes to a realization of his standing with the world, the better for himself and everyone concerned, and the higher the order of his intelligence, the quicker will this true adjustment come.

To hasten this adjustment it would be well for the college graduate to realize that his college course has done exactly what it was intended to do—given him the best possible assortment of mental tools and the best possible training for using them in his future efforts to carve out a career for himself.

The world lies ahead of him, hard and cruel, but always interesting and full of treasure for those who play the game straight, honestly and intelligently. It is a question if there ever will be a more momentous period in the life of a young man than when he emerges triumphant from college to do battle with the world.

He has many important things to decide regarding his future course of action. The first step may influence his whole future career. Of such vast importance is the careful consideration of this first step, that in the hope of impressing it as strongly as possible it seems that a little story regarding the two proverbial Irishmen who were putting up in a hotel for the first time would not be out of order—

They were in their rooms on the 8th floor of the palatial hotel.

Says Pat to Mike, "Where is the bathroom?"

Answers Mike—"Go to the end of the hall and take the last door to the left."

Pat went, opened the wrong door, stepped through and landed at the bottom of the elevator shaft, 8 floors below.

Mike, worried over Pat's absence, went to investigate.

His suspicion was aroused on seeing the elevator shaft door open, so he stepped to it and called down, "Pat, are you there?"

Faintly back from the shaft's bottom comes the answer "Yes—look out for that first step."

PRACTICAL EXPERIENCE.

Generally speaking, about the first step taken by the average college graduate is the securing of a desirable position. Comparatively few go directly into business, "lack of funds," as a rule, preventing such a step. In a way this condition at this

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* Parts of a paper presented to Section on Commercial Interests, A. Ph. A., Asheville meeting, 1924.

[1] Advertising manager, Sullivan-Slauson Drug Company, Utica, N. Y.

period of the graduate's life is a blessing, even if it is decidedly disguised, because few graduates have enough so-called "practical" drug-store experience to warrant their stepping immediately from college into a proprietor's shoes. This may be a difficult piece of logic for the graduate to comprehend, but it's true nevertheless, and he will realize the truth of it as the years roll on. His college course has given him a wonderful training—the best possible—to the extent that it was meant to, but it could not and never was meant to make him proficient in the art of handling some few thousand and one situations and conditions that arise and are peculiar to actual every-day work in the drug store. Looking at things from a selfish angle perhaps, is it not better for the graduate to familiarize himself with all of this most necessary detail in someone's else drug store than in his own? If he is associated with the right kind of a proprietor allowances will be made for his natural shortcomings, due to inexperience; he will be corrected before harm is done one way or another, and under the watchful eye of the management will be gradually brought to as near a degree of perfection as is possible. And all of this will be done without any perceptible effect on the regular functioning of the store's business. On the other hand if the graduate were to embark immediately in business for himself—well, he might possibly under certain circumstances and with a lot of luck manage to come through all right, but the chances are that through his handicap of practical inexperience, and through his efforts to ferret out for himself certain fundamentals absolutely necessary for the successful conduct of a drug store, he would find himself up against such a Herculean task that final surrender to the inevitable "crash"would be almost certain. The college graduate is thoroughly versed in all of the subjects embraced in the college curriculum, but none of these subjects were ever intended to impart a thorough knowledge of certain business principles absolutely necessary, as before stated, to running a successful retail drug store. Such knowledge of vital importance can be obtained only by one method—and that is through actual experience and close observation. So then, though a graduate may be fortunate enough to possess enough "wherewithal" or "backing" to immediately, upon graduation, embark in business for himself, it is not, for his own sake, and for the sake of the community in general, advisable to do so. He should not consider himself competent to go into business for himself until he has rounded out at least two years as a pharmacist in the employ of someone else. Three or four years would be still better. And this regardless of how many years he put in as apprentice before entering college. No college graduate can afford to jeopardize his career by inviting possible business failure through going into business prematurely. The two or three years spent as an employee of the other fellow is very apt to be an experience to which the success in later years, to a greater or lesser degree, can be attributed. This same period as an employee helps him to become a better employer. By this is meant that the employee is given a taste of what life is like when working for the other fellow. If he, the employee, is of the right kind of stuff, his experience in this respect will undoubtedly make him more tolerant with his "help" when he becomes an employer. There is no question about the fact that the man who has "been through the mill" makes the best employer. He has a broader understanding and is more tolerant. For these reasons he is more popular with his help, coöperation with him is more complete, and his business naturally benefits.

Thus it is that the most logical step for the college graduate to take is to seek a job.

SECURING EMPLOYMENT.

This is another matter in which a certain amount of discretion should be used. Of course there are jobs and jobs. The country is full of them most of the time. There are good jobs and bad jobs, in big cities and small towns. In many instances the college graduate's finances are so depleted from the drain incident to his years in college that almost any kind of a job appeals to him. As a rule he ends up by taking the one that pays the higher wages—regardless of the nature of the work and, it might be added, the bent of the people to whom he has hired out. And it is a question if anything that can be said here will ever change the graduate's attitude in this respect. Nevertheless, there are many things to be taken into consideration in seeking and accepting positions, besides money. The big question in the graduate's mind when seeking a position should be: "Which position will give me the broadest all-around practical drug store experience between now and the time I go in business for myself?" The wage to be received should be of secondary consideration, for the reason that the wage received will neither make nor break the recipient, during the interim between college and ownership, while the quality and quantity of the experience received might.

Now, of course, the little hamlet, the village, and the small city must have their druggists. Some of the drug stores in small cities compare very favorably and in some instances are far ahead of big city stores for volume and variety of business done. This is the exception however. Generally speaking, the live drug stores in the big cities are the ones enjoying the big volume and variety of business. Towards such stores, then, it would be well for the college graduate to turn, in seeking the position from which he could derive the most benefit in later years.

BUSINESS TRAINING.

The live store in the big city is the logical place for the college graduate to complete the business training of his college course.

Science says that there are no two persons of exactly the same mental and physical make-up. Ordinary observation proves that without the aid of science. The tastes and thoughts in men have much to do with the world's progress; the why and wherefore of these variations of human taste and thoughts will not be discussed; we know they exist and are difficult to overcome; so difficult, in fact, that even a college training along lines completely opposite to the natural urge, fails to wholly obliterate them. All young pharmacists have certain natural tendencies and in seeking positions they should as far as possible make selections which will give them the opportunities for work that they like best because, as a rule, one makes the biggest success of work in which he is most interested.

It is admitted that theoretically the pharmacist is trained to compound prescriptions and to do work pertaining to this art; it is known actually, however, that in the modern up-to-date drug stores of to-day there are many other departments of the drug store in which the pharmacist must work. For instance, the modern drug store must have to a greater or lesser degree, depending, of course, on the size of the store and its general character, besides its prescription clerk, a buyer, advertising manager, sales manager, display manager, photo supply depart-

ment head, toilet department head, etc. It is admitted that much of this work can be done by unlicensed men, but the licensed man may have the work to do and profit by the experience. In very few strictly professional pharmacies is there enough prescription work to warrant the devotion of all of the pharmacist's time to that work.

The college graduate who seeks a position in a big city drug store should decide upon what line of work appeals to him most; he should analyze his preference and qualification carefully in this respect. This may or may not be difficult. For instance, if it is found that one has a strong desire to become a manager, the chances are that he will be successful as such; if advertising appeals to him strongly, that is the branch in which he should start. Each possible line of drug-store work should be considered in this manner and then if possible a position should be obtained that will offer the best opportunity for studying methods peculiar to the desired position. One may ask, why so fussy about all of this, if the graduate is merely looking for experience until he goes into business for himself? Because, in order to be a success specialization to the nth degree is absolutely necessary nowadays. Business as it is carried on in to-day's drug store is of such a variety and scope that it is impossible for any one man to become expert in all of its branches. Therefore, the young man who specializes in one division, and absorbs all the knowledge he can of the others without interfering with the first, detracts in no way from possible success when he engages in business on his own account, but of greater importance is the comprehensive training he gets for taking care of himself in the eventuality (which comes often) of his never opening a store of his own.

For the graduate who is thoroughly convinced that he has a natural aptitude for practical pharmacy work, the strictly professional store should be his destination. Therein, as in no other store, will he have the opportunity through further study and application to advance in the profession of pharmacy to a point set only by his abilities.

For the graduate who finds that he has a decided leaning towards managerial, advertising, merchandising, buying, or display work, a position in the chain or larger individual stores should be sought. While it is granted that an unlicensed man could perhaps qualify in any of these positions, the licensed man with his college training and consequent familiarity with drugs is much better fitted than the former for any of these branches of work and is the only logical candidate for such positions. A manager, an advertising man, a buyer, a merchandiser, a display man, without an intimate knowledge of his goods, such as can only be obtained in a college course, would be greatly handicapped. On the other hand the college graduate, with the very knowledge that the unlicensed man lacks, is in a position to make a success of any one of these branches of work.

There exists a strong tendency in the average college graduate to "look down" on branches of drug store work such as the ones spoken of, because they are not strictly professional. Such an attitude on the graduate's part is all wrong. Each and every branch mentioned is an important one in every well-regulated drug store and is vital to the success of the business. To have become through hard study and close application a graduate pharmacist is indeed no small honor, but to be a pharmacist and also proficient in one or more of the other capacities mentioned is not only a double honor but a worth-while accomplishment that is bound to demand most de-

sirable recognition. Mastery of some one of the vital branches of retail or wholesale drug store work assures reasonable success, provided personal qualification and adaptation are not wanting. Those who have had years of experience can point to examples of successful men in all of the departments named. Retailers seek men of real ability along these lines and are ready to pay and to pay big for their services. The writer is well acquainted with one young pharmacist who entered the employ of one of the largest individual drug stores in the country as a clerk about ten years ago. He developed an intensive desire for being up on prices, both cost and selling. He studied prices systematically. Such application naturally produced results. His ability in this direction was almost uncanny. At just about this time a manager was needed. This man was given the position over the heads of older employees. In this particular store the manager did the buying. The securing of this position was the result simply of his specializing as he had done in prices. Needless to say he made good as manager-buyer and held this position for seven years. But he never stopped studying prices, the market and methods of buying. About three years ago one of the biggest department stores in the country sought and secured his services. He reduced the stock of the corporation and created a larger volume of sales than the firm had ever enjoyed. On the strength of this record, in January 1923 this man, who specialized in prices, secured a position with another larger concern as buyer-manager of the drug and toilet goods department at a salary of between $6000 and $7000 a year. And the end is not yet, for he is still a comparatively young man of good habits who is bound to go on and up. This is but one concrete example of hundreds of similar ones that might be given. The retail stores are full of men of mediocre ability; specialists and men of action are sought for.

The experience which the college graduate gets in the big city drug store is bound to be of great value to him in more ways than one. To begin with, the environment of big city life, especially to those brought up in small towns, will, to a certain extent, test the kind of stuff of which a young man is made. By the way he reacts to it will his true character be shown, not only to others, but to himself. The proverbial and varied temptations of big city life are always present in fact as well as in theory. In the average big city drug store the graduate is brought in touch not only with all sorts and manner of people but conditions which enable him to study humanity and its many-sided affairs; the manner in which he reacts to this experience denotes his true character. He should school himself to separate the good from the evil and to stick to the good. Thus and thus only will he build character, uprightly, the most valuable asset a man can have in the business world.

Many young men just out of college have a tendency to overestimate their actual value. This overestimation would not be so bad, perhaps, if they could keep it a secret, but as Abe Martin says, "it's hard for a man to have a corner on himself and not show it in his gait." Such an attitude arouses antagonism against a man and works to his detriment. No man is sufficient unto himself. He must depend on his fellow-men to a great extent, especially in the retail drug business, for his success. He must create good-will for himself among his associates and customers; he is greatly handicapped by an overabundance of objectionable personal traits. He should study the personalities and conduct of the big man in business. Employment in a big city drug store tends to correct erroneous opinion,

both as to ability and shortcomings; his constant contact dealings with conditions and people will teach him the proper value and balance of things as nothing else can.

Employment in the big city drug store also offers the best opportunity for studying up-to-the-minute business methods and policies. The average big city drug store functions from a business standpoint, along the lines that are as correct as human minds can make them. This is not so generally true of small town stores; but there is hardly a big city store business method or policy that would not work to an advantage in the former.

The standing of the retail drug business of the future is almost entirely in the hands of to-day's graduates. The standards of any business or profession rest entirely on the shoulders of that business or profession's personnel. The profession of pharmacy of the future will be as good or bad as the ideals of the present-day graduate.

MODERN PHARMACY IN CHINA.

BY CHARLES O. LEE.*

Not so long ago the writer went into a modern dispensary in a large inland city of China. This store was found to be well stocked with all sorts of imported proprietary and patent pharmaceuticals. There was also a good stock of surgical instruments and supplies and a complete line of toilet articles. Most of these goods were in original sealed packages so that the purchaser could feel reasonably sure of the quality of the goods purchased here. There is also a prescription department in this store where modern prescriptions are received and filled in all confidence. Upon inquiry it was found that the pharmacist in charge had learned pharmacy in a store in Shanghai, having served a little more than a year as an apprentice.

This is the story of western pharmacy in China as it rapidly spreads from the larger centers inland. Those of us trained in the profession, with respect for it as such, receive a shock when brought face to face with such conditions. We are told that there are no laws in China regulating western medical and pharmaceutical practice. However, both foreign and Chinese western trained practitioners are quite well organized, so that there is at least a strong moral influence as regards modern medical practice in China. There is no such good thing for western pharmacy.

Nearly all of the branches of science, including medicine, are offered in the curricula of various Chinese and foreign modern educational institutions in China. So far we have heard of only one place where western pharmacy has been made a part of the regular educational work. Even in this place only a start has been made and just a few have completed the pharmacy course.

The mission hospitals in China have found it quite necessary to train some responsible young man to do their routine pharmacy work. Nothing like a sound course in pharmacy can be offered in hospital dispensaries, where equipment and teaching staff are scarcely adequate to carry on the most urgent part of the work. Occasionally a hospital has been able to train a few more men than it needed for its own use, thereby allowing them to be released for other places. Quite often

* Nanking University, Nanking, China; on furlough until 1925, Purdue University.

men with the meager training of a few years in a hospital pharmacy go out and establish a small dispensary for themselves. To know some of these men is to wonder what happens to the tolerant and suffering public.

Of the many educational surveys of mission work in China, none, not even the most recent, has seen fit to recommend any educational work in pharmacy. Rather a very recent survey recommended that our mission institutions do not offer courses in pharmacy. It is quite clear that those making such a recommendation were not pharmacists in any sense. The writer, however, is quite convinced that the opportunity has come and the need for educational courses in western pharmacy is at hand. He is also assured that at least one reputable mission university would be interested in adding such a course to its curriculum if funds were provided for its maintenance. The funds needed to offer a course in pharmacy in a school that already has courses in chemistry, biology, physics and other allied subjects should not be large. It would be necessary to offer, in addition to the present courses, only the necessary courses in pharmacy and materia medica.

Students taking such a pharmacy course could graduate with a degree equivalent to the degrees offered in science, agriculture and forestry. Such a course as suggested would be the equivalent of our best courses in America, so far as the essentials are concerned. Men so trained would be prepared to do the pharmacy work of modern hospitals; or if they should choose to open dispensaries, they would be educationally if not fundamentally better qualified than most apprentices are to do so.

In China, as in America, we find doctors promoting the best interests in medicine, agriculturists working for better conditions and larger returns in agriculture, foresters not only planning ways for best conserving the forests at hand but also working on the problem of afforestation. The engineers are busy at developing the industries of the country. Men who are promoting the best interests of their science or profession are largely men of schooling and experience. Pharmacy, in this respect in China, has hardly made a beginning. The door is wide open to make a worthwhile place for pharmacy in science and education. Pharmacists will have to claim for pharmacy whatever place she is to have in China. There is no other hope. We have shown that western pharmacy is already in China, and is here to stay. We have suggested the route by which it has come. The drug manufacturing interests of nearly every leading country have found China a buyer.[1] Drugs are a great matter of interest to these people. They have a complete and extensive system of pharmacy of their own, which will gradually give way to the newer and, we hope, better system of the west.

The students of China know virtually nothing of pharmacy as a subject of science and research, and are interested to hear about it, as the writer has occasion to know. Not only is there an unusual opportunity for good schools of pharmacy in China but there is a rich field for research in native drugs and chemicals. The writer was told recently by a native drug dealer that China has one hundred thousand different important drugs used in medicines. Perhaps so. At least it would

[1] The United States Pharmacopœia has been translated into Chinese—see under Committee Reports. Professor Lee suggests that here is a possibility for the American Pharmaceutical Association to promote pharmacy in China. He suggests a department of pharmacy for Nanking University.

be interesting, and no doubt valuable as a contribution to modern medicine, to study the possibilities of Chinese native drugs and drug products.

WHAT SHOULD A PHARMACIST KNOW TO SERVE FULLY?

THE COMMONWEALTH STUDY OF PHARMACY.

BY JULIUS A. KOCH.

The committee in charge of the study of pharmaceutical education from the functional point of view is convinced that the knowledge necessary in order that the pharmacist may serve adequately should be determined in the light of the public demands upon them rather than in relation to the ideas of any particular group.

While a comprehensive survey of all the duties expected of a pharmacist would undoubtedly serve as a satisfactory basis for determining the specific background of knowledge essential for their proper fulfilment, the question naturally arises as to the manner of the interpretation of the data obtained. Pharmacists are of course concerned deeply in knowing the extent to which the opinions of outstanding successful practicing pharmacists are to weigh in the final decision.

The entire study is based upon the actual experience of pharmacists and the committee keenly realizes that the ideas of those actively engaged in the practice of pharmacy have value of the highest order. The committee has planned to avail itself liberally of the views of practicing pharmacists, primarily, because of their value, but also in recognition of the fact that pharmacists are the ones most vitally concerned in the outcome of the survey.

Since the true gauge of success in any endeavor is inclining more and more toward completeness of the service rendered to the public, the committee has decided to consider exhaustively or in detail this aspect of pharmaceutical activity. It believes that, measured by this standard, pharmacy should certainly be entitled to high standing.

Basing its opinion upon years of fair dealing characterized by an emphasis on the part of the pharmacist toward the public good rather than material gain, the public has come to regard the pharmacist, not merely as a surveyor of merchandise, but a man who is ever ready to give honest and expert advice regarding his merchandise.

This public regard charges the pharmacist with a deep responsibility. Public opinion concerning him and his profession earned through generations of self-sacrifice upon the part of pharmacists everywhere is possibly one of pharmacy's chief possessions. Even those who seem almost entirely to neglect professional practice, or at least regulate it to an inferior place in the conduct of their business, freely admit the tremendous value of the prestige of the professional aspect of pharmaceutical practice.

How best to conserve this public regard and, if possible, increase the extent to which pharmaceutical service can be developed, is the problem of those studying pharmacy from the functional point of view. A consideration of all the data obtained from a survey of representative stores, together with the other information, should, the committee believe, if properly interpreted, serve as a satisfactory basis for determining the knowledge necessary in order that the pharmacist may serve fully.

THE DEPARTMENT OF THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES

TENTATIVE PROGRAM FOR THE TWENTY-FIFTH ANNUAL MEETING OF THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES TO BE HELD AT BUFFALO, N. Y. HOTEL STATLER, AUGUST 25–26, 1924.

First Session—Monday, August 25, 2:00 P.M.

Roll Call.

The Presidential Address—Charles W. Johnson, Seattle.

Report of the Secretary-Treasurer—Zada M. Cooper, Iowa City.

Appointment of the Nominating Committee.

Reports of the Standing Committees:

Executive Committee, C. B. Jordan, Chairman.

1. Committee on Higher Educational Standards, D. B. R. Johnson, Chairman.
2. Committee on Curriculum and Teaching Methods, W. J. Teeters, Chairman.
3. Committee on Activities of Students and Alumni, E. L. Newcomb, Chairman.
4. Committee on Relation of Pharmacy Schools and Other Professional Schools, W. F. Rudd, Chairman.
5. Committee on Research, Albert Schneider, Chairman.
6. Committee on Distribution of Information Concerning Prerequisite Legislation, W. B. Day, Chairman.
7. Committee on Investigation of Pharmacy Schools by the Carnegie Foundation, E. H. Kraus, Chairman.

Paper—"Methods of Procedure in Changing Requirements"—Theodore J. Bradley.

6:00 P.M. Annual Conference Dinner at Hotel Statler.

Second Session of the Conference—8:00 P.M.

Address by a prominent educator.

Reports of Special Committees:

A—Committee on Inspection and Classification of Colleges, D. B. R. Johnson, Chairman.

B—Committee to Study Pharmaceutical Education from the Functional Standpoint, J. A. Koch, Chairman.

C—Committee on Selection of Degree for 3-Year Course, Charles H. LaWall, Chairman.

D—Committee to Confer with Secretary of the Treasury Relative to Publication of the Digest of Comments on U. S. Pharmacopœia and National Formulary, Samuel L. Hilton, Chairman.

E—Committee on Cultural Subjects in a Pharmacy Curriculum, W. F. Rudd, Chairman.

Joint Session of the National Association of Boards of Pharmacy and American Conference of Pharmaceutical Faculties—Tuesday, August 26, 9:00 A.M.

Address by Dr. W. W. Charters of the Personnel Department of the Carnegie Institute of Technology.

Discussion of Topics of Interest to Both the National Association of Boards of Pharmacy and American Conference of Pharmaceutical Faculties.

Third Session—Tuesday, August 26, 2:00 P.M.

Unfinished Reports.

Papers:—
"Standardization of Courses of Instruction in Schools of Pharmacy," Albert Schneider.
"Shall We Teach Chemistry by the Project Method?"—John C. Krantz, Jr.
Miscellaneous Business.
Election of Officers.
Executive Session.
Adjournment.

NATIONAL CONFERENCE ON PHARMACEUTICAL RESEARCH.

THE BUFFALO MEETING.

The third annual meeting of the National Conference on Pharmaceutical Research will be held at Hotel Statler, Buffalo, on

Saturday, August 23, 1924.

The first session will be called to order at 9:30 A.M., and the afternoon session will begin at 2:00 P.M. An evening session will be provided for if necessary.

The program of the meeting will include:

Reports of Officers.
Report of Committee on Revision of Constitution and By-Laws.
Report of Committee on Research Problems.
Reports of the 10 Standing Committees of the Research Conference.
(*a*) Dispensing Pharmacy.
(*b*) Manufacture of U. S. P. and N. F. Galenicals.
(*c*) Standardization of U. S. P. and N. F. Galenicals.
(*d*) Manufacture of Medicinal Chemicals.
(*e*) Standardization of Medicinal Chemicals.
(*f*) Sources and Identification of Botanic Drugs.
(*g*) Standardization of Botanic Drugs.
(*h*) Chemistry of Drug Plants.
(*i*) Biological Products.
(*j*) Business Research in Pharmacy.
New Business.
Election of Officers.

Voting power is vested in the delegations from the following national organizations:

American Conference of Pharmaceutical Faculties.
American Drug Manufacturers' Association.
American Pharmaceutical Association.
American Pharmaceutical Manufacturers' Association.
Bureau of Chemistry, U. S. Department of Agriculture.
National Association of Boards of Pharmacy.
National Association of Retail Druggists.
National Formulary Revision Committee.
Proprietary Association.
U. S. P. Revision Committee.

Unofficial observers have been invited from the following organizations:

American Therapeutic Association.
Council on Pharmacy and Chemistry, A. M. A.
Drug Plant Seminar Group.
Section on Medicinal Chemicals, A. C. S.

Invitations are also being sent to all individual research workers now members of the scientific committees of the several member organizations enumerated above.

A large attendance is earnestly desired.

H. V. ARNY, *Chairman*, National Conference on Pharmaceutical Research.

PHARMACEUTICAL FORMULAS

PROPOSED FOR "BOOK OF UNOFFICIAL FORMULAS, A. PH. A."

The formulas heretofore published will be found in Volume I, JOURNAL A. PH. A., pp. 169, 366, 505, 637, 760 and 1307; Volume V, pp. 309, 422, 529, 631, 748, 862, 991 (see also p. 1129), 1126, 1265 and 1397; Volume VI, pp. 79, 194, 298, 393, 486, 563, 643, 729 and 823. See also Volume X, pp. 292, 382, 468, 534, 628; Volume XI, pp. 551, 624; Volume XIII, pp. 357, 471, 562.

For list of committee members and committees see April issue, 1921, p. 292; also refer to Roster on p. X of this issue. Suggestions for formulas, and comments on those published are invited. They may be sent to a member of the Committee or to Chairman J. Leon Lascoff, 1223 Lexington Ave., New York, N. Y.

No. 824.

FLASHLIGHT POWDER.

Magnesium, powdered	300.0
Potassium Chlorate	600.0
Antimony Sulphide	100.0

Five to 10 grams to be used at a time. Caution: Great care must be exercised on account of its explosive properties.

No. 825.

FLY SPRAY.

Eucalyptol	100.0
Oil of Bergamot	30.0
Acetic Ether	100.0
Cologne Water	50.0
Methanol, enough to make	1000.0

One part in 10 of water as spray.

No. 826.

FOOT POWDER.

Salicylic Acid	30.0
Starch	100.0
Powdered Talc	870.0

No. 827.

FOOT POWDER.

Zinc Stearate	267.0
Boric Acid	66.0
Powdered Talc, enough to make	1000.0

No. 828.

SAGE HAIR TONIC.

Fluidextract of Sage	60.00
Tincture of Green Soap	50.00
Tincture of Cantharides	12.00
Glycerin	30.00
Menthol	15.00
Bay Rum	125.00
Oil of Bergamot	15.00
Alcohol U. S. P.	250.00
Water, enough to make	1000.00

No. 829.

INCENSE POWDER.

Cloves	50.0
Cassia Bark	50.0
Cascarilla	100.0
Benzoin	160.0
Olibanum, enough to make	1000.0

No. 830.

IRON SALICYLATE MIXTURE.

(Mistura Ferri Salicylatis, Braitwaite.)

Iron Sulphate, Crystals, Sodium Salicylate, of each	15.0
Glycerin	150.0
Water, enough to make	1000.0

No. 831.

INVISIBLE INK.

Cobalt Chloride	125.0
Mucilage of Acacia	125.0
Distilled Water, enough to make	1000.00

No. 832.

VASELINE POMADE.

Oil of Lemon	13.3
Oil of Geranium (African)	26.6
White Wax	200.0
Liquid Paraffin, enough to make	1000.0

No. 833.

WHITE POMADE.

Oil of Lemon	2.0
Oil of Bitter Almonds	10.0
White Wax	300.0
Liquid Paraffin, enough to make	1000.0

No. 834.

YELLOW POMADE.

Crocus, powdered	5.0
Oil of Cloves	90.0
Spermaceti	200.0
White Wax	200.0
Liquid Paraffin, enough to make	1000.0

No. 835.

COMPOUND MANDRAKE PILLS.

Podophyllin	1.50
Leptandrin	3.00
Iridin	3.00
Ipecac	0.75
Extract of Hyoscyamus	0.75

Mix and make 100 pills.

No. 836.

MOSQUITO REPELLANT.

Oil of Citronella	32.0
Oil of Pennyroyal	32.0
Oil of Eucalyptus	64.0
Methanol, enough to make	1000.0

No. 837.

NAIL POWDER.

Carmine	13.0
Oil of Lavender,	
Oil of Bergamot, of each	7.0
Tin Oxide	973.0

No. 838.

POISON IVY LOTION. A.

Sodium Hyposulphite,	
Glycerin, of each	120.0
Water, enough to make	1000.0

No. 839.

POISON IVY. B.

Sodium Bicarbonate	20.0
Sodium Borate	8.0
Phenol	10.0
Rose Water, enough to make	1000.0

Dissolve the salts in the rose water, add the phenol and filter.

No. 840.

SHAMPOO (for oily scalp).

Oil of Eucalyptus,	
Oil of Pine Needles, of each	2.0
Glycerin	30.0
Alcohol U. S. P	60.0
Castile Soap	250.0
Water, enough to make	1000.0

No. 841.

SHAMPOO (for dry scalp).

Alcohol U. S. P	120.0
Rose Water	250.0
Soft Soap	630.0

No. 842.

NON-ALCOHOLIC TONIC.

Quinine Sulphate	2.5
Phosphoric Acid Dilute	30.0
Tincture of Orange Peel, sweet	60.0
Glycerin	60.0
Tincture of Nux Vomica	15.0
Spirit of Chloroform	15.0
Water, enough to make	1000.0

No. 843.

GENERAL TONIC.

Iron-Quinine Citrate	60.0
Glycerin	650.0
Chloroform Water	120.0
Water, enough to make	1000.0

No. 844.

CHARCOAL TOOTH PASTE.

Wood Charcoal, fine powder	250.0
Cinchona, fine powder	250.0
Vanilla Sugar, 10%	250.0
Oil of Cinnamon	5.0
Honey	250.0

No. 845.

CHARCOAL TOOTH PASTE.

Wood Charcoal, fine powder	250.0
Orris, fine powder	250.0
Precipitated Chalk	500.0

Glycerin, enough to make a paste.

No. 846.

WATERPROOFING FOR CANVAS.

Gutta Percha	250.0
Resin Spirit	750.0

No. 847.

WORM POWDER.

Podophyllin	0.4
Santonin	0.8
Calomel	4.0
Sugar of Milk	8.0
Cinnamon, fine powder	4.0

Mix and make 50 powders.

No. 848.

TO MAKE GLASS TRANSLUCENT.

Dextrin	100.0
Zinc Sulphate,	
Magnesium Sulphate, of each	150.0
Water, enough to make	1000.0

The following presented by C. P. Wimmer:

No. 849.

SHAMPOO BAY RUM.

Oil of Bay	2.0
Oil of Pimento	2.0
Oil of Orange	0.5
Potassium Carbonate	100.0
Green Soap	150.0
Glycerin	20.0
Alcohol U. S. P	480.0
Distilled Water, to make	1000.0

No. 850.

SHAMPOO POWDER.

Sodium Bicarbonate	50.00
Ammonium Carbonate	5.00
Borax	5.00
Terpineol	3.00
Hyacinthin	1.25
Oil of Bergamot	1.75

No. 851.

SHAMPOO SOAP LIQUID.

Cocoanut Oil	22.00
Cottonseed Oil	26.00
Stearic Acid	12.00
Potassium Hydroxide	14.00
Pot. Carbonate	3.00
Alcohol U. S. P.	14.00
Distilled Water, to make	350.00

Talcum, *q. s.* Melt the stearic acid in the hot oils (about 92°). Add the alkalis dissolved in 100 cc. of distilled water, and heat until saponified. When cool add the alcohol and water *q. s.* Filter till clear.

No. 852.

CASEIN OINTMENT.

(Unguentum Caseini.)

Soluble Casein	14.00
Glycerin	7.00
Petrolatum	21.00
Carbolic Acid	0.50
Distilled Water, to make	100.00

No. 853.

SOFT ZINC PASTE.

Linseed Oil	20.00
Lime Water	20.00
Zinc Oxide	30.00
Calcium Carbonate	30.00

No. 854.

ALMOND MEAL.

Almond Meal	100.00
Orris, medium powder	50.00
Borax, powdered	5.00
Oil of Bitter Almonds	0.50
Oil of Bergamot	0.20
Oil of Cananga	0.20

No. 855.

PEROXIDE TOOTHPASTE.

Prepared Chalk	35.00
Magnesium Carbonate	6.00
Orris, fine powder	3.00
Calcium Peroxide	3.50
Oil of Cloves, Oil of Peppermint, Oil of Star Anise, of each	one drop

Presented by the Chairman:

No. 856.

SPARTEINE SULPHATE TABLETS.

Sparteine Sulphate	1.5
Sugar of Milk	8.0
Alcohol	
Ether, *q. s.*	

Make 100 tablets.

No 857.

HEART STIMULANT TABLETS.

(Da Costa's Formula.)

Tincture of Digitalis	0.12
Tincture of Strophanthus	0.12
Tincture of Belladonna	0.015
Nitroglycerin	0.0006

One tablet.

No. 858.

GLYCERITE OF TRAGACANTH (B. Ph. 1898).

Tragacanth, powdered	1.0
Glycerin	3.0
Mix and add	
Water	1.0

Pill excipient.

No. 859.

ELIXIR OF VERONAL SODIUM.

Veronal Sodium	10.0
Compound Tincture of Cardamom	25.0
Simple Elixir	60.0
Water, enough to make	500.0

No. 860.

ETHEREAL SOAP.

Soft Soap	32.0
Alcohol	20.0
Methylated Ether, enough to make	100.0

Dissolve the soap in 20.0 mils of alcohol, allow to stand 24 hours, and decant carefully from sediment; then add methylated ether enough to make 100.0.

No. 861.

CARMINATIVE MIXTURE.

(W. H. Wilcox. Med. Press.)

Tincture of Ginger	12.0
Compound Tincture of Cardamom	36.0
Tincture of Capsicum	4.0
Spirit of Ether	12.0
Spirit of Chloroform	6.0
Peppermint Water, to make	180.0

No. 862.

SALOL VARNISH FOR PILLS.

Salol	2.0
Shellac	3.0
Absolute Alcohol	3.0
Ether	3.0

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE BOARD OF DIRECTORS.

Office of the Secretary, 192 Roseville Ave., Newark, N. J.

LETTER NO. 18.

June 17, 1924.

To the Members of the Board of Directors:

97. Division of Headquarters Fund for Building and Endowment: Chairman Beal rules that the vote on Motion No. 24 (see item 82, page 484, Letter No. 16, and item 89, page 569, Letter No. 17) is in the negative and the motion is lost, since it did not receive a majority vote of the Board. This means that the Board has taken no step to divide the headquarters fund for building and endowment purposes.

98. Additional Appropriation for Headquarters Committee: Motion No. 26 (see item 92, page 570, Letter No. 17) has been carried.

99. Approval of Appointment: Motion No. 27 (see item 94, page 571, Letter No. 17) has been carried. This approves the appointment of H. C. Fuller as delegate to the Fourth Congress of Industrial Chemistry at Bordeaux, France.

100. National Formulary Committee in Research Conference: Motion No. 28 (see item 95, page 571, Letter No. 17) has been carried. This gives approval of the membership of the N. F. Revision Committee in the National Conference on Pharmaceutical Research and provides for payment of annual membership fee of $20.

101. Election of Members: Motion No. 29 electing applicants numbered 372 to 405, inclusive, has been carried. The Secretary of the Board of Directors has notified the applicants of their election.

102. Approval of Meeting Program: No necessary suggestions, changes or additions to the tentative program for the seventy-second meeting of the A. Ph. A. as outlined in item 85, pages 485–486, Letter No. 16, have been received. It is therefore in order to adopt the tentative program as submitted.

(*Motion No. 30.*) *It is moved by Fischelis that the tentative program for the Buffalo meeting published in Letter No. 16 be adopted as the official program.*

103. Appropriation for Drug Trade Bureau of Public Information: Dean LaWall, Chairman of the Finance Committee sends the following communication:

"Please enter a motion as coming from me for the appropriation of $200 for 1923 dues in the Drug Trade Bureau of Public Information. The amount was not called for in that year and the appropriation lapsed. The bill is now before us for payment of dues both for 1923 and 1924 and the only appropriation available is for dues for 1924. Hence the necessity for the motion.

Very truly yours,

CHARLES H. LAWALL."

(*Motion No. 31.*) *It is moved by LaWall that $200 be appropriated for annual dues of A. Ph. A. to Drug Trade Bureau of Public Information for 1923.*

104. Bank for Headquarters Fund: The following communication has been received from Treasurer E. F. Kelly:

"The National Exchange Bank of Baltimore and the Dime Savings Bank of Boston are now approved depositories for the funds of the A. Ph. A. Hynson, Westcott & Dunning have asked that the Drovers & Mechanics National Bank of Baltimore be also approved in order that collections from the Headquarters Building Fund may be deposited in this bank. This happens to be the bank of deposit of the firm, and it would, of course, be much more convenient for them to use it as a depository for the Headquarters Building Fund. This bank has agreed to allow 4% interest on this fund as a savings account, and I shall be glad if you will place before the Board of Directors a motion to approve the Drovers & Mechanics National Bank for the purpose mentioned.

Very truly yours,

E. F. KELLY, *Treasurer.*"

(*Motion No. 32.*) *It is moved by Kelly that the Drovers & Mechanics National Bank be approved by the Board of Directors as a depository for the Headquarters Building Fund.*

105. Applicants for Membership: No. 406, Reginald E. Spicer, 920 E. Broadway, Glendale, Calif.; No. 407, Daniel Haywood Smith, 445—4th St., N. E., Washington, D. C.; No. 408, Benjamin Nathan Goldstein, 2135 Wylie Ave., Pittsburgh, Pa.; No. 409, John Hodgson, 535

Monongahela Ave., Glassport, Pa.; No. 410, Leland Richard Burgess, 3917 West 9th St., Little Rock, Ark.; No. 411, George Alvin Miller, White Horse Pike, Barrington, N. J.; No. 412, George W. McDuff, 3117 Chestnut St., New Orleans, Louisiana; No. 413, William P. Winter, 415—25th Ave. So., Nashville, Tenn.; No. 414, Louis Bender, 452 Park Ave., Perth Amboy, N. J.; No. 415, Maxim H. Doctofsky, 435 Broadhead Place, Perth Amboy, N. J.; No. 416, George LaDuca Barone, 300 West Ave., Buffalo, New York; No. 417, Peter Freess, 576 3rd Ave., New York City; No. 418, John Smyth Russell, 1508 W. Cullerton St., Chicago, Ill.; No. 419, Sadashiv P. Nair, Nair Bldg., Lamington Road, Bombay, India; No. 420, David N. Ginsburg, 1369 E. 105th St., Cleveland, Ohio; No. 421, Ralph F. Senese, 86 Clinton Ave., Brooklyn, N. Y.; No. 422, Israel Rabinovitch, 579 Columbus Ave., New York City; No. 423, Samuel S. Schindelman, 98 Ellery St., Brooklyn, N. Y.; No. 424, Harry B. Judlowitz, 330 Koscluske St., Brooklyn, N. Y.; No. 425, Benjamin Leo Tell, 134 Ludlow Street, New York City; No. 426, Roland Lambert Moser, 244 Main St., Freemansburg, Pa.; No. 427, Donald H. Campbell, 4134—12th Ave., N. E., Seattle, Washington; No. 428, Guerch Hornik, 3904 Girard Ave., Philadelphia, Pa.; No. 429, David William Steinberg, 2648 South Sixth St., Philadelphia, Pa.; No. 430, Frederick Emerson Lehman, 7101 Woodland Ave., Philadelphia, Pa.; No. 431, Kathryn Parmley Urch, 1800 Arch Street, Philadelphia, Pa.; No. 432, Stuart B. Austin, 233 S. 4th St., Reading, Pa.; No. 433, Charles Byron McDermott, 406 E. Jefferson St., Morris, Ill.; No. 434, Robert A. Acheson, 8 Park Ave., Cambridge, Mass.; No. 435, Lewis B. Jones, 19 Rogers Ave., Somerville, Mass.; No. 436, Andrew Landini, 11 Greenwood Terrace, Somerville, Mass.; No. 437, G. Ashley Matthews, 4 Peach Street, Belfast, Maine; No. 438, Edward Curtis Hyde, 522 Grant Ave., Millvale, Pa.; No. 439, Richard B. Samuelson, Milford, Nebraska; No. 440, Geza J. Kiss, 5651 Melrose Ave., Los Angeles, Calif.; No. 441, Harry Irwin Sherrir, 224 Erin St., Pittsburgh, Pa.; No. 442, John Edward North, 216½ Conemaugh St., Johnstown, Pa.; No. 443, Paul Childs, 2304 Sherbrook Street, Pittsburgh, Pa.; No. 444, Walter M. McMillen, 656 Gregg Ave., Bridgeville, Pa.; No. 445, Harold Ware Belzner, 807 Bedford St., Johnstown, Pa.; No. 446, Ralph Reginald Patch, 25 Congress St., Stoneham, Mass.; No. 447, Samuel Roseff, 1385 Fulton Ave., New York City; No. 448, Melvin LeRoy King, 55 E. Main Street, Westminster, Maryland; No. 449, Francis Edward Kronkoski, 21 Sycamore St., Natrona, Pa.; No. 450, Frank B. Thomas, Jr., 134 Center St., Meyersdale, Pa.; No. 451, Stanley H. Dobbs, 2701 Walnut St., McKeesport, Pa.; No. 452, Leo Kramer, 6029 Stanton Ave., Pittsburgh, Pa.; No. 453, Isador H. Goldstein, 1109 Chislett St., Pittsburgh, Pa.; No. 454, Howard George LeGoullon, 6941 Mt. Vernon St., Pittsburgh, Pa.; No. 455, John Donatelli, 7045 Fletcher Way, Pittsburgh, Pa.; No. 456, William Bertram Hupple, 4810 Monongahela St., Pittsburgh, Pa.; No. 457, Elmer William Haggerty, 1550 Beechmeir Ave., Pittsburgh, Pa.; No. 458, Clarence Joseph Wharton, Third and Center Sts., Pitcairn, Pa.; No. 459, Frank Joseph Palermo, 5 Prospect Ave., Pittsburgh, Pa.; No. 460, Lawrence Obermeier, 422 Edmond St., Pittsburgh, Pa.; No. 461, Harry Aaron Wilkofsky, 314 Wayne Ave., Ellwood City, Pa.; No. 462, Edgar Harold Schwartz, 303 Holland Ave., Braddock, Pa.; No. 463, John Robert Schauwecker, 74 Warren St., Crafton, Pa.; No. 464, Frank Joseph Kobelak, 105 So. 15th St., Pittsburgh, Pa.; No. 465, Walter Cecil Young, 119 Jones St., Woodlawn, Pa.; No. 466, Sol Herman Kalet, 815 Wylie Ave., Pittsburgh, Pa.; No. 467, Wilson Robert Yohe, 5717 Center Ave., Pittsburgh, Pa.; No. 468, Ralph Russell Kartab, 3217 Dawson St., Pittsburgh, Pa.; No. 469, Leon Bradford Rayl, 1906—7th Ave., Beaver Falls, Pa.; No. 470, Michael N. Lutsky, 1550 Centre Ave., Pittsburgh, Pa.; No. 471, Charles Harold Buechner, 304 Harrison Ave., Vandergrift, Pa.; No. 472, Esther Meyer, 6548 Yale Ave., Chicago, Ill.; No. 473, Harry Pilatowsky, 482 Decatur Street, Brooklyn, N. Y.; No. 474, Grant Meyer, 618 So. Washtenaw Ave., Chicago, Ill.; No. 475, Arthur Zelig Rosen, 106 South 13th St., Pittsburgh, Pa.; No. 476, Jacob D. Mednick, 738 Sackman St., Brooklyn, N. Y.; No. 477, William London, 685 Metropolitan Ave., Brooklyn, N. Y.; No. 478, Julius Haas, 713 So. 4th St., Philadelphia, Penna.; No. 479, Charles S. Evans, 577 M. Clinton Ave., Trenton, N. J.; No. 480, William H. Regan, 11 Washington Ave., Bergenfield, N. J.; No. 481, Alexander W. Wolfe, 78 Beverly Street, Newark, N. J.; No. 482, Minnie Weber, 558 Bedford Ave., Brooklyn.

(*Motion No. 33.*) *Vote on Applications for Active Membership in the A. Ph. A.*

ROBERT P. FISCHELIS, *Secretary*,
Board of Directors, A. Ph. A.

CONVENTION WEEK PROGRAM AT BUFFALO, AUGUST 25–30, 1924.

Headquarters at Hotel Statler. For Association and Section Officers see p. X. For Program of Research Conference of A. C. P. F. see Department American Conference of Pharmaceutical Faculties of this issue. See also p. XX, Advertisers' Section, this issue.

General Program.

MONDAY, AUGUST 25.

9:00 A.M. Meeting Bd. of Directors, A. Ph. A.
9:00 A.M. Natl. Assoc. Boards of Pharmacy.
2:00 P.M. Natl. Assoc. Boards of Pharmacy.
2:00 P.M. Am. Conf. Pharm. Faculties.
8:00 P.M. Natl. Assoc. Boards of Pharmacy.
8:00 P.M. Am. Conf. Pharm. Faculties.

TUESDAY, AUGUST 26.

9:00 A.M. Joint Session N. A. B. P. and A. C. P. F.
2:00 P.M. Natl. Assoc. Boards of Pharmacy.
2:00 P.M. Am. Conf. Pharm. Faculties.
2:30 P.M. Special entertainment for the ladies.
7:00 P.M. First Session, House of Delegates.
8:00 P.M. First General Session, A. Ph. A.

WEDNESDAY, AUGUST 27.

9:00 A.M. First Session, Historical Section.
9:00 A.M. First Session, Section on Commercial Interests.
9:00 A.M. First Session, Scientific Section.
2:00 P.M. Second Session, House of Delegates.
7:00 P.M. Meeting of the Board of Directors.
9:00 P.M. President's Reception and Ball.

THURSDAY, AUGUST 28.

9:00 A.M. First Session, Section on Practical Pharmacy and Dispensing.
9:00 A.M. First Session, Section on Education and Legislation.
9:00 A.M. Second Session, Scientific Section.
9:00 A.M. First Session, Women's Section.
2:00 P.M. Second General Session, A. Ph. A.
2:00 P.M. Automobile ride to East Aurora and visit to the Roycroft shops and tea for the ladies only.
4:00 P.M. Third Session, House of Delegates.
7:00 P.M. Meeting of the Board of Directors.
8:30 P.M. Illustrated Lecture.*

FRIDAY, AUGUST 29.

9:00 A.M. Second Session, Historical Section.
9:00 A.M. Second Session, Section on Commercial Interests.
9:00 A.M. Third Session, Scientific Section.
1:30 P.M. Second Session, Section on Education and Legislation.
1:30 P.M. Second Session, Section on Practical Pharmacy and Dispensing.
2:00 P.M. Matinee for ladies only.
3:00 P.M. Final Session, House of Delegates.
7:30 P.M. Final General Session.
9:30 P.M. Meeting of the Board of Directors.

SATURDAY, AUGUST 30.

All-day trip to Niagara Falls and Lower Gorge.

*May be open to the public.

Tentative Program of the Sections.

For Section Officers see p. X.

Scientific Section.

WEDNESDAY, 9 A.M. *First Session.*

1. Chairman's Address, J. P. Snyder.
2. Report of Secretary, Paul S. Pittenger.
3. General Business.
4. *Pharmacology and Biologic Assay.*
   "A Palatable Cod Liver Oil Concentrate Possessing the Curative Properties of Cod Liver," Harry E. Dubin.
   "The Toxicity of Aspirin-Quinine Mixture," E. A. Ruddiman and C. F. Lanwermeyer.
   "A Pharmacodynamic Study of Two Oils of Chenopodium," A. R. Bliss.
   "The Paramecial Method for the Standardization of the Digitalis Series," Albert Schneider.

THURSDAY, 9 A.M. *Second Session.*

5. *Biological Chemistry.*
   "Silico-Tungstic Acid as a Quantitative Reagent for Alkaloids," Geo. D. Beal and Edward O. North.
   "The Concentration and Silver Ion Concentration of Argentum Proteinicum," I. M. Kolthoff.
   "The Permanence of Tincture of Iodine U. S. P.," D. M. Copley.
   "Concerning the Behavior of Gastro-Intestinal Enzymes in the Presence of Certain Antiseptics."
   Part 1—"Pepsin on Egg Albumin," E. V. Kyser and C. R. Whitehead.
   Part 2—"Pancreatin on Starch," E. V. Kyser and H. E. Whitmire.
   Part 3—"Pancreatin on Milk," E. V. Kyser and Paul H. Thompson.
   "Some Critical Points of Emulsification in Soap-Oil Emulsions," E. V. Kyser and Frank C. Vilbrandt.
   "Preliminary Chemical Investigation of Euphrasia Officinalis," L. E. Sayre.

Report of Committee on Ebert Prize, A. G. DuMez.

THURSDAY, 8:30 P.M. *Joint Session with Section on Practical Pharmacy and Dispensing.*

6. *Symposium on U. S. P. and N. F.*
   Report on U. S. Pharmacopœia, E. F. Cook.
   Report on National Formulary, Wilbur L. Scoville.
   Plans, Program, etc., of the Bureau of Chemistry, standard samples Dept. of Agriculture for supplying to the manufacturers of the various drugs which require physiologic assay, J. C. Munch.

FRIDAY, 9 A.M. *Third Session.*

7. *Botany and Pharmacognosy.*
   "A Morphologic Study of Miré," Heber W. Youngken.
   "Cultivation of Opium Poppy in North Carolina," E. V. Howell.
   Nomination of Officers, Reports of Committees, Unfinished Business, Election and Installation of Officers, New Business, Adjournment.

PRACTICAL PHARMACY AND DISPENSING.

THURSDAY, 9 A.M. *First Session.*

1. Chairman's Address, Robert J. Ruth.
2. Report of Secretary, William H. Ford.
3. General Business.
4. "An Experiment on Extraction," E. F. Kelly and John C. Krantz, Jr.
5. "The Hospital Pharmacist's Opportunities," Henry J. Goeckel.
6. "Denaturants in Distilled Extract of Witch Hazel," Charles H. LaWall and J. W. E. Harrisson.
7. "The A. PH. A. Formulary," J. Leon Lascoff. (Demonstrations accompanied by more than 500 specimens of preparations, and 150 lantern slides. A general discussion will follow the presentation.)

THURSDAY, 8:30 P.M.

Joint Session with Scientific Section; for program see Scientific Section.

FRIDAY, 1:30 P.M. *Second Session.*

1. "Prescription Clinic," Adley B. Nichols and J. L. Nebinger.
2. "Branches of the A. PH. A. in Schools of Pharmacy," E. V. Kyser.
3. A Paper, Henry J. Goeckel.
4. "Hospitals in China," Harvey V. Stokely.
5. "Should Our Definition for Sugar Be Broadened? If So, Why?" L. E. Sayre.
6. "A New Emulsifying Agent for Volatile Oils," Charles H. LaWall.
7. "The Drug Store Window and Its Potentialities as an Advertising Medium," F. H. Peck.
8. A Paper, William J. Stoneback.
9. "Glycerin Suppositories," Wilbur L. Scoville.
10. "The Status of the Hospital Pharmacist," Edward Swallow.
11. A Paper, Melvin A. Bamford.
12. "Our Pharmaceutical Conventions—Why We Should Attend Them," Frances M. Greenwalt.
13. What Shall Be the Scope of the A. PH. A. Formulary?" Ivor Griffith.
14. "Temperature Effects in Making, Diluting and Keeping the Carrel-Dakin Type of Hypochlorite Solution; Including the Proposed U. S. P. Formula," Irvin A. Becker.
15. "Opportunities for Qualified Pharmacists in U. S. Governmental Service, with Comments on Narcotics and Alcoholics," Cornelia Cunningham.
16. "What Is a Modern Drug Store?" F. W. E. Stedem.
17. "Pharmacy—Then Let Us Be Pharmacists," John C. Krantz, Jr.
18. "Effect of Certain Preservatives on Carrel-Dakin Solution," J. W. E. Harrisson.

Unfinished Business, Report of Nominating Committee, Election and Installation of Officers, Adjournment.

COMMERCIAL INTERESTS.

1. Chairman's Address—"College Education Main Factor for Success," Henry B. Smith.
2. Report of Secretary, W. Bruce Phillips.
3. Questionnaire submitted to Retail Pharmacists:

   Should more attention be given to the teaching of commercial subjects in colleges of pharmacy? If so, why? If not, why not?

   Is pharmacy, *as it is practiced* in your community, principally professional or commercial? Is there a trend away from, or toward, more professional practices?

   Do you believe that a retail pharmacist is ever justified in recommending a remedy for a simple ailment? If not, why not? If so, in what instances?

   Do you think a pharmacist should give first aid without compensation? Why, or why not?

Which do you consider the best and most effective sales stimulator, cut prices or service? Explain.

What, in your opinion, constitutes ideal service in the retail drug store?

What type of *recent graduate* do you find makes the best clerk, the one with long, practical drug store experience and little technical knowledge or the one who has had much technical training and little practical experience?

Are you in favor of discontinuing the practical experience requirement in our state pharmacy laws? If so, why? If not, why not?

Are you supplying physicians in your neighborhood with all the biological products used in their office practice? If not, are you equipped to do so? Who is supplying them if you are not?

Do you believe that drug stores should be classified? If so, how?

4. "Service Helps Success," Emory H. Breckon.
5. "Shall We Wait?" S. S. Dworkin.
6. "Commercial Pharmacy," Turner F. Currens.

SECTION ON HISTORICAL PHARMACY.

The program of the Section on Historical Pharmacy will be devoted principally to a reading and discussion of finished chapters in the History of American Pharmacy which, for two years, has been in process of preparation by the Section. Preliminary drafts will be submitted by authors who have not completed their chapters and the whole work will be discussed with the view to correlating the efforts of the several authors. The chapter titles and the names of their authors follow:

Introductory Chapter, Clyde L. Eddy.
Pharmaceutical Education, Wortley F. Rudd.
Pharmacy Laws in America, H. C. Christensen.
Pharmaceutical Associations, J. G. Beard.
The Practice of Pharmacy in Retail Stores, Robert S. Lehman.
Commercial Pharmacy, Harry S. Noel.
Federal Laws Affecting Pharmacy, Jacob Diner.
The United States Pharmacopœia, E. Fullerton Cook.
The National Formulary, Wilbur L. Scoville.
Biographical Sketches, Caswell A. Mayo.
Manufacturing Pharmacy, A. R. L. Dohme.
Wholesale Distribution, C. H. Waterbury.
Pharmaceutical Journalism, Francis B. Hays.
Pharmacists in Government Service, Walter M. Chase.

All members of the Association are invited to take part in the discussion of any and all chapters and to make suggestions concerning the work.

Reports on other sections will be given in August number of the JOURNAL and all of the above including those not printed in this issue will be completed and printed in the official program.

COMMITTEE REPORTS

THE PHARMACOPŒIA OF THE UNITED STATES OF AMERICA. NINTH DECENNIAL REVISION.

CHINESE EDITION.*

It will interest many to know that the Pharmacopœia of the United States, Ninth (Chinese edition), has been available both in China and in the United States for approximately nine months. The book is bound in light blue cloth, with the page approximately $7^1/_2$ x 5 inches, but reading from what would seem to the American reader to be the back of the book. It is well bound and on paper of fair quality.

A few words with reference to the publication of the book may be of interest:

Mr. Carl Crow, the publisher of the *Chinese Chemist and Druggist* and other journals, at 34 Nanking Road, Shanghai, China, conceived the idea, immediately following the war, that the publication of the United States Pharmacopœia in the Chinese language would be of real service to the physicians, druggists and the hospital attendants in China, who were frequently called upon to dispense or prescribe medicines of the Western World. In recent years, many American pharmaceutical products had appeared upon the Chinese market. Mr. Crow secured the assistance of Chinese scholars from the university, and was able to complete the translation in the course of several years. The Board of Trustees of the Pharmacopœia granted him permission to

* Agents Chun Hwa Book Co., Shanghai, China.

use the text. It is hoped that the new book will further extend the influence of Western medicine in this rapidly developing country.

Copies have not yet been placed on sale in America but may be obtained by addressing the publishers in China, the price being $2.00 in gold or $4.00 in Mexican money.

It is hoped that the U. S. P. X, when it is available, will be also translated, that the latest progress in Western Pharmacopœias may be made available to the Orient.

L. K. Sung (B.A. and M.D., of St. John's University, Shanghai) who has just completed two years' special study at the Philadelphia College of Pharmacy and Science, with the view of qualifying himself for the study of Chinese drugs and the furtherance of pharmacy in China, has reviewed the book from the viewpoint of its service to China, submitting the following interesting discussion.

"In considering the need of a translation of the Pharmacopœia of the United States into the Chinese language, it is necessary to point out that there are two distinct lines of medical practice in China to-day, namely, the European and the native. The former includes all foreign physicians practicing in China and the Chinese physicians who acquired their medical training in America or Europe, or those who are graduates of recognized medical schools in China. The rapid increase in number of the western practitioners, with special reference to the English-speaking class, has actually brought about the need for a standard formulary among themselves. The Chinese translation of the U. S. P. will, in all probability, safely guide the pharmacists in compounding the prescriptions from those physicians, and in this they are chiefly concerned.

"The present Chinese edition of the U. S. P. is prepared specially to meet the needs of those Chinese physicians and pharmacists, particularly the latter, who have been adopting the U. S. P. as their standard, but who are yet unable to fully comprehend the terms given entirely in English. A casual review of the new book indicates that the work of translating has been done with great exactness and this is very gratifying especially in a first translation.

"In a work of such magnitude, it is seemingly impossible to avoid some typographical errors or minor imperfections but none have been found which will be of great consequence. It is worthy of note that in this edition will be found the correct and up-to-date Chinese nomenclature for chemistry and botany.

"As is to be expected from any reliable translation, it presents practically a duplicate of the U. S. P. IX, in the Chinese language. The present edition begins with the historical introduction, the general principles adopted in the Ninth Decennial Revision, and then the Introductory Notices before proceeding to the translation of the text proper. In Part I, the drugs are arranged alphabetically according to the Latin titles. The Chinese names, however, are given at the head of each drug or its preparations and then immediately followed by English titles, Latin titles, abbreviated Latin titles and finally the synonyms, if any. Chemical formulas and their respective molecular weights are also given.

"It will be observed, however, that the preface, the International protocol and the comparative table showing the strength of the more important pharmacopœial substances and preparations in the preceding and in the present Pharmacopœia, are all omitted. It is also a loss to the book to find no English Index, which, if given, would have materially facilitated reading or reference. It is hoped, therefore, that a revised edition may be soon forthcoming in which the much-needed Index will be included.

"Much credit is due those who prepared this edition, which should give the Chinese pharmacists and physicians a reference book of great value and usefulness and at the same time should be in the hands of all who take an interest in foreign Pharmacopœias."

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Board of Directors."—Part of Chapter VI, Article VI of the By-Laws.

Article IV of Chapter VII reads: "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates."

Reports of the meetings of the Local Branches should be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly, and manuscript should be signed by the reporter.

UNIVERSITY OF NORTH CAROLINA.

The April meeting of the University of North Carolina Branch, American Pharmaceutical Association, was held in the Pharmacy Building on Wednesday evening, April 30.

The meeting was attended by several pharmacists of the state, including Dr. E. V. Zoeller, president of the North Carolina Board of Pharmacy. A. L. I. Winne of Richmond, secretary of the Virginia State Pharmaceutical Association, was also present.

Dean Wortley F. Rudd of the Department of Pharmacy at the Medical College of Virginia, delivered an interesting lecture on "Pharmacy —Its Obligations and Future in the South." The speaker gave a brief history of pharmacy, including the progress the profession has made in the last few years. He stressed the fact that if the profession is to progress further the pharmacists as a whole must stick together and stand behind the different pharmacy associations.

After the lecture a strictly "Pharmaceutical Banquet" was given in honor of Dean Rudd.

During the month of April the Branch has added forty-four new members to its fold; thirty-seven of the new members, however, are registered pharmacists in the state. This brings our total membership up to one hundred and thirty-two.

MAY.

Since our last regular meeting the members of the Branch have been socializing quite a bit. On May 17, Dean E. V. Howell entertained the senior class and the members of the Branch with a fishing party and picnic. We were entertained again on the evening of May 29 by Prof. E. V. Kyser at his home.

The Branch feels very grateful toward Dean Howell and Professor Kyser for the interest they have taken in the association this year.

The officers for the ensuing year are: *President*, J. A. Meacham; *First Vice-President*, J. L. Thompson; *Second Vice-President*, Edward Haupt; *Secretary-Treasurer*, J. M. Spoon; *Member of the House of Delegates*, E. V. Kyser.

C. R. WHITEHEAD, *Secretary*.

UNIVERSITY OF WASHINGTON.

The regular monthly meeting was held May fourteenth at Bagley Hall, President Shaw presiding. Attention was called to the annual elections taking place at the next meeting, and a nomination committee appointed. The chair then introduced Mr. S. F. Worswick of the Taylor Instrument Company, Rochester, N. Y., who presented an able and interesting talk on the manufacture and use of thermometers. Many illustrations of the process of manufacture were thrown on the screen. Mr. Worswick concluded his talk with a few well-presented remarks on the value and meaning of the word "service" in connection with retail pharmacy. One hundred and five were in attendance.

JUNE MEETING.

The final meeting of the school year was held June ninth at 6:30 P.M. A dinner at the University Commons preceded the business of the evening. Annual reports of officers were presented. It was interesting to note from the secretary's report that the Washington membership in the A. Ph. A. has been increased by nearly 100 during the past twelve months. The following officers were elected to serve during the next school year: *President*, A. H. Lehman; *Vice-President*, D. H. Campbell; *Secretary*, Harriet Snidow; *Treasurer*, Caty Braford; *Membership Committee:* P. A. Monroe, *Chairman;* V. Johnson, P. O. Maloney; *Program Committee*, D. H. Campbell, *Chairman;* D. H. Allen, Annette Hardinger; *Delegates to Convention:* C. W. Johnson, O. A. Anderson.

The meeting adjourned after a general discussion relative to plans for continuation and growth for next year. H. A. LANGENHAN, *Secretary*.

EDITORIAL NOTES

Editor: E. G. EBERLE, Bourse Building, Philadelphia, Pa.

Board of Directors, A. PH. A.: JAMES H. BEAL, *Chairman;* S. L. HILTON, *Vice-Chairman;* ROBERT P. FISCHELIS, *Secretary;* CHARLES H. LAWALL, HENRY M. WHELPLEY, JOHN G. GODDING, GEORGE M. BERINGER, CHARLES E. CASPARI, W. L. SCOVILLE. *Ex-Officio:* H. V. ARNY, President; WILLIAM B. DAY, Secretary; E. F. KELLY, Treasurer. Committee on Publications: R. P. Fischelis, *Chairman;* H. V. Arny; Geo. M. Beringer; E. F. Kelly; Wm. B. Day; A. G. DuMez, E. G. Eberle.

Collaborators: The members of the Board of Directors; the Editor of the YEAR BOOK, A. G. DUMEZ, Hygienic Laboratory, Washington, D. C.; E. FULLERTON COOK, Chairman, U. S. P. Revision Committee; W. L. SCOVILLE, Chairman, N. F. Revision Committee; the Vice-Presidents-elect, A. Ph. A.: LYMAN F. KEBLER, F. E. BIBBINS, W. BRUCE PHILIP; the Chairmen of the Sections, A. Ph. A.: J. P. SNYDER, G. A. BERGY, ROBERT J. RUTH, HENRY B. SMITH, CLYDE L. EDDY; L. L. WALTON, Chairman of the House of Delegates, A. Ph. A., CHARLES W. JOHNSON, President A. C. P. F.; CHARLES B. JORDAN, Chairman Executive Committee, A. C. P. F.; F. E. MORTENSON, President, N. A. B. P.; HENRY C. CHRISTENSEN, Secretary, N. A. B. P.

ALL-PHARMACY BUILDING PROJECT MAKES SPLENDID PROGRESS.

UNITING OF TREMENDOUS POWER AND INFLUENCE OF THE DIFFERENT BRANCHES OF THE DRUG INDUSTRY, AND ESTABLISHMENT OF PUBLICITY BUREAU HELD TO BE IMPORTANT FEATURES OF THE NEW ALL-PHARMACY HEADQUARTERS BUILDING.

During the past month Publicity Director E. L. Newcomb, of the University of Minnesota, has been engaged in presenting before various state, county, and local pharmaceutical organizations the proposed plans for the All-Pharmacy Headquarters Building. Addresses have been delivered before drug organizations in Illinois, Ohio, Missouri, Arkansas, Michigan, Wisconsin and other states. Wholesalers, manufacturers, retailers, students, clerks, and teachers have been represented in the audiences. In every case unanimous support has been pledged for the All-Pharmacy Building project. Numerous subscriptions have been made, and added interest and enthusiasm developed.

In many other sections of the country, organization work has been in progress, and hundreds of new subscriptions have been received at headquarters in support of this great undertaking. Retail pharmacists in some ten different states have already subscribed over $125,000, and another sum of over $125,000 has been subscribed by retailers in other sections of the country. Vigorous campaigns are going on in many sections of the United States, and new campaigns are being opened almost daily. Just as this article is being written, word comes from Iowa of successful campaigns in four new counties, resulting in nearly $2000 being added to Iowa's previous total of some $13,000. Report is also received from retailers in Virginia adding $7000 for that state. The District of Columbia, under date of June 14, sent in additional subscriptions by retailers amounting to $1000. Illinois, Indiana and Kentucky are each sending in subscriptions by retailers at the rate of about $1000 per week. In Maryland, Massachusetts, Michigan and Minnesota, active campaigns are in progress, and total subscriptions for these states range from $5000 to $30,000 each. Each week brings in hundreds of new subscriptions, those from retailers ranging mostly from $25 to $100 each. In Missouri an active campaign has just been started and splendid results are promised by the organization committee. New Jersey, New York and North Carolina have strong committees at work, and splendid results are being reported weekly. Ohio, Pennsylvania and Tennessee are likewise carrying on aggressive campaigns and promising results are being reported.

In some states campaigns were slow getting started on account of failure to realize the great advantage which an All-Pharmacy Building would be to retail druggists. Now that the value of federation and establishment of a publicity bureau and general service features is appreciated, retailers are glad and willing to coöperate in the great undertaking. The campaign committee and associates feel confident that as retail pharmacists come more and more to a realization of the opportunity

before them, the campaign will gain in strength and prestige, and that the full million dollars which is necessary will be subscribed.

BULLETINS OF THE DRUG TRADE BUREAU OF PUBLIC INFORMATION.

Further bulletins of the Drug Trade Bureau of Public Information have been issued by Director Robert P. Fischelis. Bulletin No. B–20 relates to pharmaceutical research work which is reported in the May number of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, page 469. Bulletin B-21 outlines the program of the American Pharmaceutical Manufacturers' Association at French Lick Springs. Bulletin B-22 refers to 100 orders "to cease and desist" that have been issued in a period of little over twelve months by the Federal Trade Commission. General Counsel Charles Wesley Dunn of the American Pharmaceutical Manufacturers' Association states that this is a surprisingly small number under the circumstances, three-fourths of these orders being directed against the using of false pretenses in inter-state commerce. Bulletin B-23 outlines the program of the American Pharmaceutical Association to be held at Buffalo during the last week of August, and directs attention to some of the principal events, and among these the report on the Headquarters Building. During the same week the American Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy will hold their annual meetings. Bulletin B-24 discusses the narcotic situation in this country as presented by Secretary Samuel C. Henry of the N. A. R. D. He contended that if the situation with respect to illicit distribution of narcotics was as well in hand as the legal distribution the situation would be most gratifying. He points out that the divisions of the drug trade are all deeply concerned in this matter and are ready in every possible way to aid in its control.

PERSONAL AND NEWS ITEMS.

Ambrose Hunsburger, of Philadelphia, has recently been honored by election to the presidency of the Pennsylvania Pharmaceutical Association; as president of a Trust Company which he helped to organize a year or more ago, and by election as associate fellow of the American Medical Association.

Dr. Leo H. Baekeland, president of the American Chemical Society, has been made a Commander of the Order of Leopold by King Albert of Belgium. The crosses of an officer of the Legion of Honor in France, and of the Order of the Crown of Belgium have previously been conferred upon him.

Dr. David I. Macht, lecturer in pharmacology and therapeutics at Johns Hopkins University, was awarded the degree of Doctor of Pharmacy, *honoris causa,* by the University of Maryland.

Prof. Morris Phipps, for eight years member of the faculty of the Medical College of Virginia, has become associated with Parke, Davis & Co., with headquarters at Richmond.

Dr. Richard V. Mattison, whose hobby is the peony and who is a member of the A. Ph. A., has one of the finest and largest gardens of peonies in this country. In all there are about 3500 plants, on each of which there are from 50 to 100 great blooms, whose colors blend from most perfect white to shell-pink and from shell-pink to brilliant crimson. Doctor Mattison distributes hundreds of baskets of the peonies every year to the sick and the poor.

Dr. William D. Haggard, president-elect of the American Medical Association, is a native of Nashville, Tenn. Here he was educated and practices his profession. He was Surgeon to Evacuation Hospital No. 1 at Toul, France, and later consultant in surgery at the Mesves Hospital Center, during the World War.

Charles O. Lee, member of the faculty at Purdue University, now of Nanking University, China, speaks of the need for a pharmacy school of university grade in China, in a paper of this issue. Professor Lee expects to return to the United States next year.

Harry S. Noel left the middle of May for a six weeks' trip to the Coast during the course of which he spoke at various pharmaceutical gatherings. His first stop was at Topeka, Kansas, and from there he proceeded to San Diego, Los Angeles, San Francisco, Portland, Salt Lake City, Denver, Chicago and home to Indianapolis. Mr. Noel is a past chairman and secretary of the Section on Commercial Interests.

Dr. Albert Schneider is lecturer in the summer session of the University of California course in criminology; this is the eighth season that he has assisted in this work.

George H. Needham, former assistant state chemist of Washington, A. A. Denny Fellow and pharmaceutical research worker at the

University of Washington College of Pharmacy, has accepted appointment as analytical chemist for E. R. Squibb & Sons.

Charles H. LaWall has been elected to membership in the Societé de Pharmacie of Paris, according to an announcement by the secretary-general of the Society, L. Gimbert.

Walter Rothwell, of Hatboro, has been named member of the Pennsylvania Board of Pharmacy by Governor Pinchot. The appointment was unsolicited and came as a surprise to Mr. Rothwell. He is at present associated with his brother in the ownership of stores in Willow Grove, Jenkintown and Hatboro.

Thomas J. Keenan has returned to the editorship of *Paper;* as indicated, Mr. Keenan was for a number of years associated in the same capacity with this publication.

Prof. William Trelease contributed an interesting sketch of "four generations of memorable botanists" to the *Scientific Monthly* for July—Augustin, Pyramus de Candolle (1778–1841), Alphonse de Candolle (1806–1893), Casimir de Candolle (1836–1918) and Augustin de Candolle (1868–1920).

John Blocki, of John Blocki & Son, permanent recording secretary of the C. V. D. A., was struck by a street car and badly hurt. An X-ray examination showed a fracture of one of the leg bones. The doctors express the opinion that he will be on his feet again in three or four weeks. The accident occurred May 27th.

The American Druggists' Fire Insurance Company has increased its capital stock to $1,300,000, making it the largest Ohio stock company. Following the May meeting about 2000 shares of stock were made available for distribution among retail druggists at book value. The number of shares per state have been apportioned according to the number of druggists.

The July issue of the *Druggists Circular* is an association number and much of this interesting matter relates to the American Pharmaceutical Association, its history and accomplishments.

The July *Bulletin of Pharmacy* is inviting answers to a series of questions pertaining to home and business life, viewpoints and aspirations of those connected with pharmacy.

OBITUARY.

TURNER ASHBY MILLER.

T. A. Miller, member of the American Pharmaceutical Association since 1894, died May 16th at his home in Richmond, aged 62 years. Secretary A. L. I. Winne, commenting on the life of the deceased in the *Virginia Pharmacist*, said "that Virginia lost one of its most outstanding members and the city of Richmond, one of its most valuable citizens." He served on the Board of Pharmacy of Virginia for twenty-two years and was for a number of years its secretary. He was an ex-president of the Virginia Pharmaceutical Association and his work and influence in that organization extended to other associations. He was active in the formulating of laws relating to pharmacy and as a result of the activities of himself and others Virginia had a respectable narcotic code prior to the enactment of the Harrison anti-narcotic law.

Mr. Miller was one of the early teachers of pharmacy in the old University College of Medicine and one of the founders of the school. He graduated from the Philadelphia College of Pharmacy in 1883. For years he conducted a retail pharmacy on Broad Street where he enjoyed a large acquaintance with the people of Richmond and this business now passes into the hands of his son, T. A. Miller, Jr.

Mr. Miller joined the American Pharmaceutical Association in 1894 and for a number of years was a regular attendant at its annual meetings.

MISS JEAN GORDON.

Miss Jean Gordon, member of the American Pharmaceutical Association since 1902, died at Grant Hospital, Chicago, June 12, 1924, in the 70th year of her life.

Miss Gordon was a graduate of the Philadelphia College of Pharmacy in the class of 1891 and a charter member of the Women's Pharmaceutical Association of Chicago. She was one of the first women engaged in the drug business of that city, having operated a prescription pharmacy in the Marshall Field Building from December 1893 to January 1907. Later, she took up hospital pharmacy work and served in several of the Chicago hospitals as pharmacist, serving at Grant Hospital for about five years.

Miss Gordon was a pharmacist of much ability and a woman of fine character. She

had made many warm friends of the staff of Grant Hospital and among the women pharmacists. The funeral was held at the home of her sister, Brookfield, Ill.

ARTHUR C. WAGNER.

Arthur C. Wagner, member of the American Pharmaceutical Association since 1907, died at his home in Everett, Mass., June 15th, in his 61st year. He was born in Freiburg, Germany, and came to the United States at the age of fourteen. He was employed in the laboratory of Weeks & Potter for a number of years, and then entered the retail drug business. He graduated from the Massachusetts College of Pharmacy in 1908, and for nine years was engaged with John G. Godding & Co.; during the past five years he was manager for Gammon Drug Company at Brookline.

HENRY WATTERS.

Henry Watters, of Ottawa, Canada, a member of the American Pharmaceutical Association since 1912, died at his home May 11th, in his 72nd year. He was one of the best known retail pharmacists of Canada and proprietor of the Standard Drug Company of Ottawa. He was born in Ottawa, and shortly after leaving school he worked as drug clerk for several firms. In 1874, he graduated from the Ontario College of Pharmacy of which, later, he was a member of the council for many years.

At the recent municipal election, Mr. Watters became mayor of his home city, and was honored by a large majority vote. Mr. Watters attended one or more of the annual conventions of the American Pharmaceutical Association and was well and favorably known to many of its members.

FREDERICK KIMBALL STEARNS.

F. K. Stearns—son of Frederick Stearns, president of the American Pharmaceutical Association from 1866 to 1867—chairman of the Board of Frederick Stearns & Company, Detroit, died June 7th at Beverly Hills, Cal., in his 70th year. Mr. Stearns, during his earlier life, had worked in every department of Frederick Stearns & Company, and in 1887 became president of the company. While his energies during his active life were directed to the business of the firm, he was interested in many other promotions. He was an organizer of the Detroit Philharmonic Society, and the sole member of the "Empty Stocking Club" which had for its motto:—"No child in Detroit should awaken Christmas morning to find an empty stocking so long as I can help." The deceased is survived by his widow and four children: Mrs. Ralph M. Dyar, Mrs. E. W. Hubbard, Frederick Sweet Stearns and Alan Olcott Stearns.

THEODORE F. MEYER.

Theodore F. Meyer, president of the National Wholesale Druggists' Association 1911–1912, and former president of the Meyer Brothers Drug Co., St. Louis, died June 15th at his home in Tuscadera, Cal., aged 66 years. He succeeded his father in the Meyer Brothers Drug Company in 1905 until 1915, when he retired and sold his holdings in this firm. Mr. Meyer graduated in pharmacy at the University of Michigan. The deceased had been in ill health for several years. He is survived by his widow, a son, T. F. Meyer, Jr., of St. Louis, and a daughter, Mrs. Musebach of San Antonio, Texas.

SOCIETIES AND COLLEGES.

HOTEL RATES FOR BUFFALO CONVENTION, AMERICAN PHARMACEUTICAL ASSOCIATION.

Hotel Statler (1100 rooms)
Headquarters, Delaware at Niagara Square
$4.00 up, for one, bath
$6.00 up, for two, bath
$7.00 up, twin beds, bath

Hotel Buffalo (formerly Statler) (450 rooms)
Washington and Swan Sts.
$3.00 up, for one, bath
$5.00 up, for two, bath
$5.50 up, twin beds, bath

Hotel Lafayette (350 rooms)
Washington and Clinton Sts.
$2.50 for one, hot and cold water
$3.00 up, for one, bath
$4.50 up, for two, bath

Hotel Lenox (250 rooms)
North St., near Delaware
$2.50 up, for one, hot and cold water
$4.00 up, for two, hot and cold water
$6.00 up, for two, connection with bath

Hotel Touraine (250 rooms)
Delaware at Johnson Park
$2.50 up, for one, use of bath

$4.50 up, for two, use of bath
$5.00 up, one or two, with bath
Hotel Ford (700 rooms)
Delaware at Cary
$1.50 for one, no bath
$2.50 for two, no bath
$2.50 for one, with bath
$3.50 for two, with bath
$4.00 with twin beds, with bath

Special rates, more than two in room. Tub baths usually cost from fifty cents to a dollar more than the minimum prices quoted for "bath." All hotels named will be glad to furnish additional information by correspondence. Reservations can be made best direct with hotel selected.

For rates and routes to Buffalo see Advertising Section of this issue p. xx. See also program in this number, pp. 660–661.

HEADQUARTERS BUILDING.

President H. V. Arny in addressing Pennsylvania pharmacists at the Bethlehem meeting closed his remarks by reference to the campaign for raising funds for the Headquarters Building. He said, "this campaign is far more than the raising of funds to buy a house to serve as offices for the A. Ph. A. It is a drive to erect the building devoted to the service of all branches of American Pharmacy, equipped to carry out all phases of pharmaceutical work. Not the least attractive feature of the new building will be the Research Laboratory, the equipment of which is already pledged by Dr. A. R. L. Dohme of Baltimore as a memorial to his father. So it is plain that this building campaign is an important step in the progress of pharmaceutical research which I have been preaching these past five years. . . . That the half-million asked for will be raised seems almost certain. . The fund raised, the building erected, American Pharmacy will take on added dignity as a science, an art and a business, proudly maintaining its honored historic position as an important division of medical science."

OFFICERS OF STATE PHARMACEUTICAL ASSOCIATIONS, 1924–1925.

(Secretaries of associations are asked to make corrections and send in list of officers and names of next convention city.)

ALABAMA.

President, W. G. Fowler, Montgomery.
Vice-Presidents, W. S. Brasfeld, Demopolis, Louis Howle, Sheffield, C. L. Hagan, Birmingham.
Secretary, W. E. Bingham, Tuscaloosa.
Assistant Secretary, Mrs. Jeanette Kerlin, Birmingham.
Treasurer, S. L. Toomer, Auburn.

The association voted to raise $3000 as an endowment scholarship for the Alabama School of Pharmacy. Addresses were made by Dr. Edsel A. Ruddiman on "The Modern Trend of Pharmaceutical Education" and by Dr. Spright Dowell, president of the Alabama Polytechnic Institute.

ARKANSAS.

President, Ed. Bradley, Hot Springs.
First Vice-President, P. R. Turner, Marianna.
Second Vice-President, Herbert Parker, Jonesborough.
Secretary, Miss Mary A. Fein, Little Rock.
Treasurer, Felix McClerkin, Little Rock.

The Association voted to hold the 1925 convention in Little Rock. E. V. Sheely of Memphis, president of the Tri-State Pharmaceutical Association, invited the Arkansas Association to hold the Tri-Convention in Memphis next year. W. J. Danforth of the Little Rock School of Pharmacy made a plea for higher educational standards and requirements. E. L. Newcomb addressed the convention and explained the value to be derived from the All-Pharmacy Headquarters.

CALIFORNIA.

President, Al C. Tienken, Lindsey.
First Vice-President, F. O. McCalloch, Los Angeles.
Second Vice-President, Victor Schaefer, Alameda.
Secretary-Treasurer, Thomas W. Jones, Los Angeles.

Del Monte was chosen as the place for the 1925 meeting. H. S. Noel spoke on "Making More Money out of Retailing;" A. F. Stepan discussed the relation between the credit man and his customer. W. C. Kottemann spoke of "Knowers and Guessers" and President F. E. Mortenson of the N. A. B. P. presented the subject of "Better Relations between Physicians and Druggists." Drug store ownership and prerequisite legislation were favored; the State Board was asked to join the N. A. B. P. The Cramton bill was opposed, price maintenance endorsed. The All-Pharmacy Headquarters was approved and all druggists of California urged to participate in establishing the fund for that purpose.

DELAWARE.

President, elected by the directors.

Vice-Presidents, S. L. Foster, Wilmington; Harry J. Pettijohn, Milford. Directors: J. O. Bosley Erdman Hoffman, J. W. Wise, Jr., and E. J. Elliott.

E. C. Brokmeyer discussed legislative matters and Ambrose Hunsberger spoke on pharmaceutical subjects; W. Warren Green gave an illustrated lecture on "Romance of Business."

FLORIDA.

President, W. M. Hankins, Daytona.

First Vice-President, Harry Stansfield, Wauchula.

Second Vice-President, F. D. Bryan, Lakeland.

Secretary-Treasurer, J. H. Haughton, Palatka.

Lakeland was chosen as the place for the 1925 meeting. Among the prominent speakers who made addresses were Dr. A. A. Murphree, president of the University of Florida, A. L. Allen, prohibition director, and Dr. T. R. Leigh.

ILLINOIS.

President, Fred L. Pfaff, Centralia.

First Vice-President, Lee M. Pedigo, Chicago.

Second Vice-President, J. B. Michels, El Paso.

Third Vice-President, E. D. Hirschy, Kewanee.

Secretary, William B. Day, Chicago.

Treasurer, Geo. M. Bennett, Urbana.

The current funds of the association were increased by over $1200 during the year; 452 new members were added. "Jamie" Heron delivered an address on "Building Better Business" and Secretary Samuel C. Henry spoke on legislative activities. Extension of the pharmacy course to 3 years was endorsed; effort is to be made to have all registered pharmacists to become automatically members of the state association; that the Board of Pharmacy be given its former status; ownership bill was endorsed; steps were taken to have the state increase the appropriation for the University of Illinois School of Pharmacy; price maintenance was approved and the Governor is importuned to at once appoint an inspector for which provision was made by the Legislature. The All-Pharmacy Headquarters was heartily endorsed.

The members of the Chicago Veteran Druggists' Association made a special trip to the meeting to be present at a lunch held Thursday noon, at which President Chas. E. Mathews, Secretary Wilhelm Bodemann and Assistant Secretary Theophilus Schmid spoke, and the birthday of Albert Miller was celebrated.

KANSAS.

President, F. A. Milne, Pratt.

First Vice-President, F. M. Arbuthnot, Belleville.

Second Vice-President, Chase W. Brown, Chanute.

Treasurer, Jno. Schmitter, Gypsum.

Secretary-Manager, J. Will Kelley, Topeka.

H. S. Noel spoke on "Getting Most out of Business;" Secretary S. C. Henry discussed legislative activities; Nels Darling told the members some hard and fast truths about modern merchandising. The drug exhibit was a fine success in every way, the public showed intense interest.

This was the third convention since the inauguration of the Unit Plan of Organization and the interest and enthusiasm in its behalf is gaining. Resolutions encouraging the campaign for the raising of funds for the American Pharmacy Headquarters were heartily endorsed. One of the features of the convention was the organization of a Veterans' Auxiliary, composed of men who have been identified with Kansas pharmacy for twenty-five years, and are active members of the state association. Of this organization J. W. Cookson, Wichita, was elected President; Vice-President, J. S. Chism, Wichita; Secretary, Chan. W. Baldwin, Osborne; Treasurer, A. H. King, Manhattan.

LOUISIANA.

President, Warren E. Scott, Oakdale.

First Vice-President, August C. Flach, New Orleans.

Second Vice-President, John E. Guess, Hammond.

Treasurer, Adam Wirth, New Orleans.

Secretary, George W. McDuff, New Orleans.

Corresponding Secretary, Frances Bruseaux, New Orleans.

New Orleans was selected for the 1925 meeting. President Joseph H. Berner commended the coöperative plan of advertising as exemplified in a "truth campaign," through the columns of New Orleans papers. He

recommended that the state association subscribe $2000 to the All-Pharmacy Headquarters. The association endorsed the thorough enforcement of all laws and favored an amendment to the state law so stringent that it would guard pharmacists against being misrepresented before the public in dispensing alcoholics for medicinal purposes.

MASSACHUSETTS.

President, C. Fred Wright, Boston.
First Vice-President, Maurice W. Corbin, Worcester.
Second Vice-President, William F. Townsend, Lynn.
Treasurer, John J. Tobin, South Boston.
Secretary, James F. Guerin, Worcester.

It was voted to hold the 1925 convention at the New Ocean House, Swampscott, during the second week of June.

Among the speakers of the convention were Richard Lenihan, Bureau of Research of Harvard University; J. Frank DeChant, director of Sheldon School; President John H. Webster of the N. A. R. D.; Senator James F. Cavanaugh, and others. President Fred E. Jones embodied eight recommendations in his address. All of them were adopted, among them that the scholarship in the Massachusetts College of Pharmacy be continued and that the association donate the sum of $500 to the American Pharmaceutical Association Building Fund.

MICHIGAN.

President, John Weisel, Monroe.
First Vice-President, E. J. Fletcher, Grand Rapids.
Second Vice-President, J. T. Vincent, Lapeer.
Treasurer, George H. Moore, Caro.
Secretary, Louis V. Middleton, Grand Rapids.

Among the speakers of the convention were E. L. Newcomb, Dean Edward H. Kraus, John H. Webster, president N. A. R. D., and others. An ownership bill was endorsed, also prerequisite requirement and American citizenship of those who seek to become registered as pharmacists. The Pharmacy Headquarters for American pharmacy was endorsed.

NEBRASKA.

President, A. E. Carlson, Dannebrog.
Vice-Presidents, Fred Witt, Nebraska City; W. P. Connor, Wood River; Theodore Jessen, Grand Island; P. O. Devries, Frement; W. E. Davis, Paxton.
Secretary, J. G. McBride, University Place.
Treasurer, D. D. Adams, Nehawka.

The Kansas plan was adopted.

North Platte was chosen as the place for the 1925 meeting. The association voted to subscribe $250 to the American Pharmacy Headquarters and appointed a committee to solicit further funds.

NEW JERSEY.

President, Thomas K. Edwards.
First Vice-President, James L. Smart.
Second Vice-President, Robert P. Fischelis, Newark.
Secretary, Jeannot Hostmann, Hoboken.
Treasurer, Edgar R. Sparks, Burlington.

Prompt and timely resolutions were adopted by the association replying to a press item of June 11th, 1924, wherein Dr. Thomas Clark Chalmers is quoted as saying at a meeting of the House of Delegates of the American Medical Association, "there is not a drug store in the whole United States that is not dispensing alcohol in some form or other as a beverage." The quoted statement was printed in one or more daily papers; the association's reply pointed out the falsity of the declaration and that it was a misleading and degrading accusation of professional pharmacy. Copies of the resolution, as adopted, were addressed to the House of Delegates of the American Medical Association, to the press and pharmaceutical publications.

It is safe to say, in charity and realizing the possibilities of human error, that the unguarded, unfortunate and erroneous statement did not express the voice of the majority nor the views of the speaker after mature reflection. It is also possible, venturing another guess, that quick and ambitious reporters having in mind the acquisition of news made their exit with what they considered a sensational item or a scoop before effective steps were complete to prevent or repair the damage of a spoken word.

Life memberships were voted to Secretary Jeannot Hostmann and Treasurer Edgar R. Sparks. A 3-year pharmacy course in colleges of pharmacy was favored; the state board accordingly amended its rules.

President Daniel H. Hills of Spring Lake in his address made the following recommendations: Reaffiliation with the N. A. R. D.; reintroduction of the amendment to the Pharmacy Act, providing for registration of pharmacies; deletion of the so-called war ser-

vice clause from the Pharmacy Act; limiting examination by the Board of Pharmacy to citizens of the United States; legislation looking to the abolishment of the so-called drugless drug stores; establishment of an office for the Board of Pharmacy in the State Building in Trenton; all of these at a later date were concurred in by the association.

A number of addresses and a larger number of papers constituted part of the program. The Pharmacy Headquarters proposal was presented by J. Leon Lascoff and President-elect Charles W. Holton; $500 was voted by the association for this fund.

NEW YORK.

President, George R. Christ, Brooklyn.

First Vice-President, T. Bruce Furnival, Syracuse.

Second Vice-President, Herman Walter, New York.

Third Vice-President, W. B. Tongue, Poughkeepsie.

Secretary, Edward S. Dawson, Syracuse.

Treasurer, Frank Richardson, Cambridge.

Niagara Falls was selected for the 1925 convention. Among the resolutions passed at the convention were those favoring the enactment of a price maintenance law; opposing the Cramton bill and the arbitrary administration of the prohibition law; advocating a publicity campaign to place pharmacy in its true light before the public, and urging the passage of a state law to eliminate all licenses except that of registered pharmacist. The action of the State Board of Regents requiring practical experience of students entering pharmacy schools was endorsed.

The association voted to give $500 to the A. Ph. A. Headquarters Building fund.

PENNSYLVANIA.

President, Ambrose Hunsberger, Philadelphia.

First Vice-President, Peter G. Walter, Pittsburgh.

Second Vice-President, Cecil R. Bloom, Clearfield.

Secretary, Louis Saalbach, Pittsburgh.

Treasurer, F. H. E. Gleim, Lebanon.

Local Secretary, F. C. Lewis, Washington.

Executive Committee: Member, P. Henry Utech.

Washington was chosen as the place for the 1925 meeting. An interesting feature of the convention was a joint session with delegates from the Pennsylvania Medical Society. The viewpoints of the latter delegates differed from those of another speaker said to have been advanced elsewhere.

A number of very interesting addresses were made during the convention, and a demonstration of physiological assay methods by Dr. Paul S. Pittenger. Among those present from other states were President Arny and Ex-President Hilton of the A. Ph. A., both spoke for the Headquarters Building Fund. Secretary L. L. Walton of the Board of Pharmacy recommended that the Legislative Committee endeavor to have the Pharmacy law amended in such a manner as will define more clearly the names of drug store, pharmacy, or similar words having the same meaning, which recommendation was unanimously adopted. A resolution was adopted directing that steps be taken for a celebration of the centenary of the elaboration of urea by Wöhler in 1828, the first organic compound to be prepared synthetically. The following recommendations of President Utech were approved:

That a committee of five be appointed by the incoming president for the purpose of presenting a plan for the reorganization of the association and report at the next annual meeting, so that the association will better serve the interests of pharmacists and the public.

That H. A. B. Dunning of Baltimore be elected to honorary membership in the association in recognition of his service to American pharmacy.

That the association go on record as favoring a standardization of prices as proposed by various bills which have been presented to Congress from time to time.

That the Committee on Professional and Public Relations be continued as a standing committee because of what it has accomplished in bringing about more cordial relations between the medical profession and pharmacists.

That the Committee on Public Information be instructed to give the widest circulation possible to all the facts relating to illegitimate sales of alcohol and narcotics and that any member convicted of such practices be expelled from membership in the association.

That affiliation with the National Association of Retail Druggists be continued.

That the Principles of Ethics for Pharmacists as promulgated by the American Pharmaceutical Association be adopted.

SOUTH CAROLINA.

President, R. M. Dacus, Greenville.

Vice-Presidents, John H. Frierson, Charleston; M. S. Dantzler, Elloree.

Secretary-Treasurer, Frank M. Smith, Charleston.

This is the silver anniversary year of Secretary Smith. The State Board of Pharmacy was requested to exact graduation from an approved school or college of pharmacy as a prerequisite of the candidates.

TEXAS.

President, W. H. Whisenant, San Antonio.

First Vice-President, A. W. Griffith, Austin.

Second Vice-President, William G. Wilman, Brownsville.

Secretary-Treasurer, Walter D. Adams, Forney.

Home Secretary, J. W. Graham, Austin.

Historian, Chester A. Duncan, Dallas.

President Wentland urged action against "drugless drug stores." The drug show was a success and enlisted much interest. Secretary S. C. Henry discussed legislation activities. A movement was set on foot to establish a pharmacy building at the state university as a memorial to the late Dr. R. R. D. Cline. The attendance was over one thousand, possibly a record for state association attendance.

VERMONT.

President, Urban S. Livingston, Newport.

First Vice-President, W. E. Chapman, Fairlee.

Second Vice-President, R. W. Howe, Wilmington.

Third Vice-President, J. L. Slafter, Newport.

Secretary-Treasurer, F. W. Churchill, Proctor.

James F. Finneran spoke on legislative matters; among those present from the Massachusetts College of Pharmacy were Theodore J. Bradley, E. H. LaPierre and Leon Thompson.

(To be continued.)

NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

Preparations are going forward in official circles and at Washington for the twenty-sixth annual meeting which is to convene there September 22–26. As usual there will be an Exposition.

GOLDEN ANNIVERSARY MEETING OF THE NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

TO BE HELD IN ATLANTIC CITY.

Chairman Charles E. Matthews, of the Committee on Rates and Routes, has been advised by the Trunk Line Association that special convention rates will be allowed to all members of The National Wholesale Druggists' Association during the week of the convention provided they turn in at the convention not less than 250 convention certificates. This privilege will no doubt be extended by other passenger tariff associations and thus cover the entire United States.

Details regarding the trains selected, the time of their departure from important points, and their arrival in Atlantic City, will shortly be sent out in a formal announcement by Chairman Matthews. The first announcement of Chairman Schnell, of the Committee on Arrangements and Entertainment, regarding hotel reservations has met with a hearty response. It is important, however, that members who have not yet made their reservations do so without delay.

A most complete program for the entertainment and comfort of both ladies and gentlemen attending the convention is in course of preparation and it is hoped to make this, the Fiftieth Meeting of the Association, the largest in point of attendance and most successful in point of constructive business that has yet been held. The dates are September 22 to September 26, inclusive.

OFFICERS AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION.

President, J. H. Foy, Newark.

Vice-Presidents, J. H. Mallett, Des Moines, and G. A. Kinsel, Saratoga Springs.

Secretary-Treasurer, Ralph R. Patch, Boston.

General Counsel, Charles Wesley Dunn, New York.

Retiring President R. M. Cain reviewed business conditions in his address. Dr. James H. Beal delivered an address on "Law Enforcement."

WASHINGTON (D. C.) DRUG EXCHANGE.

The twenty-sixth anniversary of the Washington Drug Exchange was celebrated with a banquet last month. All officers were re-

elected. They are: *President*, Paul Pearson; *First Vice-President*, Charles E. Gross; *Second Vice-President*, R. L. Quigley; *Secretary*, H. C. Easterday; *Treasurer*, Robert N. Harper; *General Manager*, W. H. Bradbury; *Directors*—N. D. Parker, F. B. Tipton, F. T. Stone, A. V. Burdine and W. T. Kerfoot.

OFFICERS OF ONTARIO RETAIL DRUGGISTS' ASSOCIATION.

President, E. A. Rae, Woodstock.

First Vice-President, C. G. Whebby, Toronto.

Second Vice-President, E. D. Bonwell, Owen Sound.

Secretary-Treasurer, F. C. Jacobs.

The matter of maintaining ethical standards received much consideration; supervision of all drug stores was requested. J. H. Webster, president of the N. A. R. D., was one of the speakers of the meeting.

NORWEGIAN PHARMACEUTICAL SOCIETY FORMED.

At the initiative of Herr J. Brendel, the Norwegian Pharmaceutical Society has been formed. The objects of the society are to promote the scientific as well as practical progress of Norwegian pharmacy and to afford a neutral ground for the exchange of views and the discussion of pharmaceutical subjects. It seems that the purpose of this organization is to bring all Norwegian pharmacists and the several organizations of the drug trade into closer relation.

THE PHARMACIST AND THE LAW.

HEROINE ADDICTION.

In the magazine section (Sunday edition) of a number of daily papers, within the last month, the statement was made in substance or by inference—that the heroine habit was alarmingly increasing among high school students. One of our Naval Heroes is credited with giving the information; it seems to us in justice to our high schools that facts and figures should be given in a matter of this kind; in fact, the papers that published such news should, in conformity with ethics, not have printed these charges without some specific references for corroboration; they cast aspersions on these young men and women of high schools and bring into a very uninviting position the faculties and other officials of these institutions. A very similar news item appeared earlier, was more specific and, after investigation, Police Commissioner Richard E. Enright branded as false the statement that 17,000 school children in one borough of New York are narcotic drug addicts.

"The malicious propaganda," he said, "was published under the letter-head of the International Narcotic Association." Police and school records showed, he said, that not one of the 951,000 school children in New York City is addicted to narcotics.

It would seem that this statement should have prompted the papers to disprove the assertion of Commissioner Enright, even though the sensational article appeared in the magazine section; that much seems due the readers of these papers and others interested; the contribution is of a different order entirely from the stories which make up the magazine sections. By inference, if not specifically, charges are made.

DRUG ADDICTION.

The following review will serve a double purpose; first, it expresses well this writer's estimate of the report and presents the opportunity to print the views of another publication on a subject which has frequently been commented on in these columns.

"*Public Health Report No. 21, Volume 39*, issued May 23, 1924, should be brought to the attention of all who have been misled by the sensational stories appearing in popular magazines and the lay press relative to the steady increase in drug addiction in the United States. Such articles have placed the pharmaceutical and medical branches of the chemical industry in an unfavorable light which they do not deserve and, in some cases, have been so cleverly worded as to imply that these manufacturers were not adverse to the alleged growing demand for drugs of such purposes. These articles have estimated the number of addicts to be at least a million and as many more as the imagination of the writer might suggest at the moment.

"Kolb and DuMez, the authors of this public health report, have rendered a distinct service in determining by such scientific means as are available the maximum number of addicts. It is gratifying to find that this does not exceed 150,000 for the whole country and the

trend is constantly toward a smaller number. The data upon which these estimates were based are obtained from narcotic surveys and clinical reports of the various states, from the Treasury Department, the United States Army, and a number of clinics in the large cities. Another investigation is based on the dosage and the available supplies throughout the world. It is interesting to note that the total annual world production of opium, exclusive of that produced in the countries of the Far East, if used entirely for the satisfaction of addiction, would supply only about 566,000 addicts.

"The report shows 'that at no time have the actual importations of narcotic drugs into this country been greater than would be necessary to supply 264,000 addicts, assuming that they were used in their entirety for the satisfaction of addiction.' There seems no likelihood that the narcotics smuggled into the country approach this amount, for in 1923 only 542 pounds of opium and coca leaves, preparations containing opium and coca leaves, the alkaloids of opium and cocaine, and preparations containing these alkaloids fell into the possession of the Bureau of Internal Revenue in the enforcement of the narcotic laws.

"Statistics show that the number of addicts per million population during the period 1900 to 1909 was 3066; 1910 to 1919, 1547; 1920 to 1923, 546. The steady decrease in the number of addicts is believed to be due to the enactment of restrictive laws, the constant effort to enforce these laws, the increased attention given the problem by the medical profession, and the better understanding of the danger in narcotics on the part of both the physician and the layman. Popular figures have sometimes been based upon the increased number of addicts in prison as compared with former years. But this is the wrong conclusion to draw from such figures, since this increase is largely due to the rigid enforcement of recently enacted laws rather than to a general increase in the number of addicts. The authors believe that 'we may confidently look forward to the time, not many years distant, when the few remaining addicts will be persons taking opium because of an incurable disease, and addicts of the psychopathic delinquent type who spend a good part of their lives in prison.'

The data, the analysis, and discussion, as well as the conclusions reported, deserve wide dissemination."—*Industrial and Engineering Chemistry*, July 1924, p. 662.

WORKING FOR UNIFORM LAWS.

Progress toward uniformity of business law throughout the states is being made, even though slowly. It is a subject on which a report was made at the annual session of the American Bar Association last week. Eventually, it is hoped to give business a code of law that will be the same from coast to coast. "It is far more consonant with the spirit of American institutions and the constitutional rights of the states that uniformity be secured by the voluntary coöperation of all the states rather than by the increase of Federal powers."

PROFESSIONAL MEN FLOCKING TO THE UNITED STATES.

There is said to be a large number of professional men coming into the United States; evidently, judging from a comment in the *Journal A. M. A.*, many are medical men—the substance of the editorial is that since the beginning of this year the influx of physicians from foreign countries has been so great as to assume "the proportions of an avalanche." Another part of the comment is quoted, because it has general application: "There is no longer any reason why regulations for the licensing of foreign physicians should be any less rigid than American physicians have to meet in other countries. The public needs protection against the incompetent or undesirable physician from abroad no less than against the medical imposter at home."

CANDIDATES FOR STATE PHARMACY BOARD EXAMINATIONS MUST BE U. S. CITIZENS.

A number of state laws have always required that the applicant for state certificate to practice pharmacy shall be a citizen of the United States. Recently states without such provision, *i. e.*, the boards and associations have taken action relative to such requirements; in some states, perhaps in most of them, the board can fix such rules. It is a matter of importance and timely.

RENEW BASIC PERMITS BEFORE AUGUST 31.

All permits to sell or to dispense alcohol or liquors must be renewed by formal application on Form 1404 on or after July 1 and not later than August 31. "H" permits are automatically continued in force during the term

of the bond supporting them or until cancelled, suspended or revoked for cause, or voluntarily surrendered by the permittee. There "H" permits need *not* be renewed. Wholesale druggists selling intoxicating liquor, however, under the provisions and within the limitations of "B" permits must apply for the renewal of their "B" permits regardless of the fact that they may also be the holders of "H" permits for use in the conduct of their laboratories. Retail druggists holding "I" permits, which permit the retailer to dispense intoxicating liquor and use alcohol in compounding prescriptions, and physicians holding "J" permits, allowing them to prescribe intoxicating liquor, and also all "Q" permits for hospitals, sanatoriums, etc., must be renewed annually and application for renewal must be made on or after July 1 and before August 31 in the case of the renewal of all permits now in effect or issued prior to August 31, 1924.

HOW TO HANDLE ORDERS FOR DISCONTINUED SIZES OF NARCOTICS AND FILL ORDERS FOR VARIOUS KINDS OF PACKAGES.

In reply to a communication of W. L. Crounse, Washington representative of the N. W. D. A. the Prohibition Commissioner has given the following instructive information:

"It is permissible for a person or firm qualified as a manufacturer or wholesale dealer under the Harrison Narcotic Law, as amended, to fill a narcotic order form calling for a stipulated number of packages of narcotic drugs of a certain size with packages of either a greater or smaller size, provided the same description of merchandise is contained in such packages and provided, further, that the aggregate quantity supplied on such form does not exceed that which would have been supplied if the order had been filled exactly in the manner originally requested. It is also permissible in the case of pills or tablets for the manufacturer or wholesale dealer to supply not only units (packages or bottles) of a different size as stated, but also to supply pills or tablets of a greater or smaller size, provided the total narcotic content of the merchandise shipped does not exceed the total narcotic content of the merchandise which would have been furnished if the order had been filled as originally written; for instance, if a narcotic order should call for ten tubes of 1/4-grain hypodermic morphine tablets of twenty tablets each, it would be permissible to supply two bottles each containing 100 1/4-grain hypodermic morphine tablets. Similarly, it would be proper to ship, in pursuance of an order so written, one bottle containing 100 1/2-grain hypodermic morphine tablets, five tubes each containing 20 1/2-grain hypodermic, morphine tablets, four bottles each containing 100 1/8-grain hypodermic morphine tablets or twenty tubes each containing 20 1/8-grain hypodermic morphine tablets.

"In each instance the manufacturer or wholesale dealer should make proper notation on the original form in the next to the last column and advise the purchaser of the notation to be made on the duplicate."

PENNSYLVANIA RULING ON "DRUGLESS DRUG STORES."

Secretary Lucius L. Walton, of the Pennsylvania State Board of Pharmacy, has issued the following statement: "That use of the title drug store is prohibited under the state pharmacy law for use by persons who are not pharmacists, or who operate stores and do not employ a full-time registered pharmacist. In a recent court charge the court said the application of the adjective 'drugless' did not relieve the word drug store from being used illegally any more than any other descriptive adjective, such as city drug store or palace drug store."

BOOK NOTICES AND REVIEWS.

A Laboratory Manual of Qualitative Analysis, for Students in Pharmacy, by Theodore J. Bradley, A.M., B.Sc., Ph.G., Dean and Professor of Analytical Chemistry in the Massachusetts College of Pharmacy. Third Edition. 173 pages. Price $2.50. Lea and Febiger, Philadelphia. 1923.

The first 25 pages of this book are devoted to a brief consideration of the fundamentals of chemical theory that underlie methods of chemical analysis; 80 pages are devoted to tests for the most common of the metallic elements and their ions; 22 pages are given over to tests for acids and their salts; and the remainder have to do with general information on the analysis of both organic and inorganic compounds.

Besides the tests for basic and acidic atoms

or groups, there are given, under each basic element or acid, the names and formulas of the pharmaceutically important salts, those which are "official" being indicated by the legend U. S. P. In connection with the various reactions there are given unfinished equations which the student is supposed to finish. These features give to the book a value for students' use that it would not have were it only a book of directions for him to follow to get certain results. It makes the manual very much less an example of the cook-book type so common among books on qualitative analysis. While intended primarily as a college laboratory manual, it could also be of use to the busy operator of the store laboratory. F. P. STROUP.

Systematic Organic Chemistry: Modern Methods of Preparation and Estimation. By William M. Cumming, I. Vance Hopper and T. Sherlock Wheeler. pp. xxii + 535. D. Van Nostrand Company, New York, 1924.

According to the authors, all of whom are British chemists, this work is intended as a complete laboratory guide to the preparations and estimations of organic chemistry for undergraduate and post-graduate students. The work is divided into four parts which comprise forty-four chapters.

Part I includes some suggestions of practical value to laboratory students and a description of methods for conducting various operations, such as crystallization, determination of melting point and boiling point, distillation, sublimation, filtration, the drying of solids and liquids, heating under pressure, the determination of the density of liquids and use of the polarimeter.

Part II, which is by far the largest section of the book, treats of synthetic methods which involve the linking of carbon to carbon, of hydrogen to carbon, of oxygen to carbon, of nitrogen to carbon, of sulphur to carbon, of halogens to carbon, of hydrogen to nitrogen, and the linking of nitrogen to nitrogen. Under these general headings a very large number of processes and chemical reactions are described to illustrate the methods of preparation of various organic compounds. The different classes of compounds thus considered include, for example, the alcohols and phenols, aldehydes, ketones and acids, ethers, esters, and acid anhydrides, sulphonic acids, nitro compounds, and those containing the amino group. Short chapters are devoted to dyes, synthetic drugs (chloralamide, aspirin, arsenilic acid, antipyrine, veronal, sulphonal and phenacetin), electrolytic preparations (benzaldehyde, iodoform, methyl alcohol and borneol), and products from natural sources. Under the latter heading only quinine sulphate and caffeine may be considered of special pharmaceutical interest, but no reference is made to the alkaloids occurring with quinine in cinchona bark and their separation, especially quinidine, and the methods of preparation are not such as would be technically employed.

Part III comprises chiefly a description of methods for the quantitative estimation of carbon and hydrogen, nitrogen, halogens and sulphur in organic compounds, and for the determination of molecular weight, together with the estimation of various groups and some individual substances.

Part IV contains a list of reagents, test papers and solutions, and tables indicating the strength of the more commonly used acids and alkalis. In a final chapter some tests are given for the common organic acids, alkaloids and carbohydrates.

The above brief outline of the work under review may serve to indicate the somewhat unique character of its subject-matter, which differentiates it from most chemical textbooks. Although not free from errors, it will doubtless prove a useful source of information respecting the manifold operations of organic synthesis and methods employed in chemical research, but for those desiring a broader knowledge it must necessarily be supplemented by references to original literature or to works which deal more comprehensively with particular subjects. This consideration would apply especially to the large class of compounds which are primarily of pharmaceutical interest, such as the alkaloids, glucosides and other organic constituents of plants, for which any detailed account of the methods of manufacture, isolation and identification would far exceed the limits designed by the authors for the present work. F. B. POWER.

Year Book of Pharmacy, comprising official information respecting the Pharmaceutical Society of Great Britain. Scientific abstracts relating to Pharmacy, Materia Medica and Chemistry, covering the period July 1922 to October 1923. With the transactions of the British Pharmaceutical Conference at its Sixtieth Annual Meeting held in London, July 23 to 27, 1923. Editor of the abstracts, J. O. Braithwaite, Ph.C. The Pharmaceutical Press, 17 Bloomsbury Square, W. C. London.

The volume comprises xxxvii + 807 pages,

$5^1/_4 \times 8^1/_4$ in size. It is uniform in style and dimensions with the Year-Book published annually since 1870.

The first thirty-seven pages are given over to rosters of the officers of the Society; committees; boards of examiners; historical introduction; branches of the Society; statutory requirements in the dispensing and retailing of poisons; summary of regulations under the Dangerous Drugs Acts 1920 and 1923; scholarships and prizes; the School of Pharmacy; the Research Laboratory; the North British branch and the benevolent fund.

The next 227 pages comprise the abstracts relating to chemistry. This subject is subdivided into alkaloids; animal products; bacteriological and clinical tests; coloring matter; essentials oils; fats, fixed oils, and waxes; glucosides, ferments and sugars; gums, balsams and resins; inorganic chemistry; organic chemistry; plant analysis.

The Materia Medica abstracts occupy 156 pages, under the following classifications; new remedies; pharmacognosy; pharmacology; therapeutics.

The abstracts on Pharmacy fill 147 pages, with the following subtitles: dispensing; galenical pharmacy; pharmacopœia revision; notes and formulæ.

Something more than 200 pages are devoted to a report of the transactions of the British Pharmaceutical Conference, at the 60th annual meeting. The address of Chairman F. W. Gamble was replete with the subject of animal substances used to-day in pharmacy; his discussion of insulin filling more than two printed pages.

The name of Prof. J. A. Koch, Pittsburgh, Pa., is noted in the list of Corresponding Members.

A splendid subject index covers thirty-five pages and an index of authors some twenty-six pages.

The type is of such size as to make the text easily readable and there seem to be no typographical errors. The book is a credit to the Society and a valuable addition to pharmaceutical literature. CLYDE M. SNOW.

The Essentials of Physiology, Including the Pharmacodynamics of the Important Typical Drugs. By George Bachmann, M.S., M.D., Professor of Physiology in the School of Medicine of Emory University, sometime Demonstrator of Physiology in the Jefferson Medical College of Philadelphia; and A. Richard Bliss, Jr., A.M., Phar.D., M.D., Professor of Pharmacology and Physiology in the College of Medicine, Dentistry and Pharmacy of the University of Tennessee (Memphis). P. Blakiston's Son & Co., Philadelphia, 1924. Price, $3.50.

The authors of this volume sent a questionnaire to the teachers of physiology in the schools of pharmacy of the United States and Canada, and the responses received established the fact that there is a real demand for a physiological textbook of this character, *i. e.*, one specially suited to the needs of the pharmacy student. The suggestions received in the replies have been incorporated in the finished product. The subject matter presented and the arrangement meet all the requirements for physiology of "The Pharmaceutical Syllabus." Each chapter is followed by a concise and suitable presentation of the pharmacodynamics of the drugs of major importance related to the physiological functions just discussed. This excellent feature of the book is in accord with the suggestions of numerous pharmaceutic teachers of physiology and the advice of the current edition of "The Syllabus" that instruction in pharmacodynamics is best given in connection with that relating to bodily function and as a part of the physiology course.

The first paragraphs of each physiological discussion are devoted to those portions of anatomy which are indispensable in the teaching of physiology to the pharmacy student, and thus provide him with that modicum of anatomical knowledge essential to an understanding of physiology. Hygiene is aptly introduced at suitable places throughout the text. The volume is also adaptable to the dental student whose physiological instructors were also consulted by the authors and whose needs were also carefully considered.

The material is presented in a manner specially suited to the student of pharmacy, and is partly based upon original investigations of the authors and partly upon those portions of the standard medical texts on physiology which are of special interest and value to the pharmacy student and the pharmacist. The authors have demonstrated a keen appreciation of the physiological needs of the student of pharmacy. Only the broad principles of pharmacodynamics are presented with but slight reference to therapeutic applications, thereby stressing the fact that "the whole spirit of professional pharmacy, its ultimate success and its moral and professional relation with medicine render the practice of counter-prescribing objectionable." The arrangement and

presentation are original and unique, and the book meets the pressing demand for a text on physiology specially suited to the needs of the student of pharmacy.

The volume is richly illustrated by 178 excellent and suitable illustrations, many of which are in colors. Quite a number of the illustrations are original. There are 322 pages, and the page size ($6^1/_2 \times 10^1/_4$) adopted by the publishers has enabled the authors to use their illustrations to best advantage. An exceptionally good index, one of the most important parts of any text, completes this splendid volume. This book by Doctors Bachmann and Bliss is one of the most noteworthy contributions to pharmaceutical literature, and those interested in the teaching of physiology to pharmacy students will find it an ideal and invaluable guide. A. B. LEMON.

Urine Examination. By Florin J. Amrhein, Ph.G., Ph.C., Assistant Professor of Chemistry at the Massachusetts College of Pharmacy. Price, $2.00.

The subject of this review was undertaken, as the author informs us, to arrange a Manual, which will supply the necessary laboratory work in a course of instruction, given at the Massachusetts College of Pharmacy. Though we are also informed that this work is not intended as a complete treatise or textbook on the subject, one cannot help but feel that if the author had added a few extra chapters, the finished product would go far toward increasing the value of this work; for, as it is, it is more than a manual.

The work is well planned, and with a few minor exceptions is well executed. The systematic arrangement is excellent. The text is clear.

Immediately after an interesting introduction, the last five lines of which should be in italics, so as to give it the emphasis it deserves, there follows Part I. Here the author impresses one with the important general principles, as Method of Collection, Preservation, Constituents, and Physical Characteristics of the Urine. No mention is made of toluene, a urinary preservative, most frequently used in many quarters. It seems inadvisable to regard as the author suggests, on page 35, that the terms "Neutral" and "Amphoteric," for practical purposes, are synonymous. It would be better practice to give a detailed method for obtaining the Total Solids, if this is required, than to depend upon the use of the so-called Coefficients.

In Part II, there is found a review of the chemical characteristics of the normal constituents of urine, followed by Part III, in which there is considered the chemical characteristics of the abnormal constituents of the urine. In Part III no mention is made of Roberts' Test, which is widely used and more satisfactory as a test for albumin than is Heller's Test. It is also impossible to see how the author accounts for the statement that the gravimetric method for the quantitative estimation of albumin is too complicated. Surely it is not as complicated as the quantitative determinations of some of the other urinary constituents. It would be well to have Scherer's Coagulation Method included. No mention is made of urorosein and urobilin, two pigments, at least one of which is tested for routinely by some. It seems advisable that mention should have been made of Ehrlich's Diazo Reaction and some of the Kidney Efficiency Tests, as the practical worker should be familiar with these.

Part IV contains a detailed description of the constituents of the urine as found when examined microscopically. The last chapter in this section, which contains an interesting description of the colorimeter, seems out of place in this work. It should be excluded or, if it is to remain, there should be added the important colorimetric determinations of the constituents of the urine.

Part V and VI contain condensed laboratory directions for the chemical examination of the urine together with the formulas for the many Test Solutions and Reagents.

On the whole, this will prove a useful guide for the pharmacy student and especially to those whose education in urinalysis was very limited. The user of this book will not fail to have a fair basic knowledge and a clear understanding of the subject.

LOUIS GERSHENFELD.

The German publisher Georg Thieme in Leipzig, well known in pharmaceutical and medical circles the world over, sent us the two following works for review:

Gesammelte Abhandlungen. Band II. Abteilung I: Untersuchungen uber Hydrochinone and Chione. Abteilung II: Untersuchungen über Azine und Azoniumverbindungen. Von Dr. F. Kehrmann. Mit 2 Abbildungen. Lex. 599 pp.

The author, who occupies a chair at the University of Lausanne, together with his associates, assistants and students, have rendered an excellent service by the publication

of a collection of their valuable papers in book form. Vol. I published somewhat over a year ago deals with "Complex Inorganic Acids." Volume II, now before us, contains the researches on Hydroquinones and Derivatives which were begun under the author's teacher, Prof. Dr. Rudolf Nietzki.

That science is international is again demonstrated by the fact that one of the valuable papers on pp. 172–178 is written and published in French: "Sur les dérivés nitrés de l'hydroquinone."

What a mint of information is in this book can be seen from the Table of Contents which fills three and a half pages, the Author's Index which occupies the same space and the Subject Index which occupies five double-column pages. The many bibliographic references further enhance the value of this book.

Kurzes Lehrbuch der Chemie in Natur und Wirtschaft. Von Prof. Carl Oppenheimer, Dr. phil. et med. Berlin. Nebst einer Einführung in die Allgemeine Chemie. Von Prof. Johann Matula in Wien. Lex. 862 pp. Cloth $6.55.

The author is a well-known authority, having written several books on chemistry and biology. It was his aim to produce a real textbook on practical chemistry, useful to students, pharmacists, physicians, chemists, biologists and also to the laity. In the opinion of the referee he has succeeded, although the so-called "Brief Text-Book" forms a stately volume of 862 pages in Lexicon format.

Part I consists of 258 pages and deals with general chemistry and has been written by Professor Johann Matula in Vienna. Its division is excellent as can be seen from the following chapter headings: Elements, Atoms and Molecules; State of Aggregation; Constitution; Reactions; Chemical Energy. In this part the physical and chemical laws, the periodic system, radioactivity, crystallography, solutions, colloids, valence including Kossel's Theory, optical rotation, mass reaction, catalysis, status wascendi, absorption and adsorption, thermochemistry, electrochemistry and photochemistry are thoroughly explained. This ordinarily dry subject of general chemistry is interestingly written, accompanied by explanations which are strikingly clear and simple and up to date.

Part II consists of 325 pages and is devoted to inorganic chemistry and is as usual subdivided into Non-Metals and Metals. How thoroughly this subject is treated can be seen from the chapter on Phosphorus which contains: history, occurrence, physical and chemical properties, manufacture, technical uses, matches, tests and detection, physiology, pharmacology, P and H, P and halogens, P and O, hypophosphorus, phosphorous and phosphoric acids, chemical properties, manufacture, physiology, pyro and meta phosphoric acids, P and S and N. The addition of the paragraphs on history, physiology and pharmacology of the elements and their compounds is a step in the right direction which will help to make the book interesting and popular.

Part III comprises 483 pages and deals with organic chemistry. The general chemistry of this part contains an excellent chapter, "Relation between Constitution and Properties," pp. 406–422. How interesting and how instructive this chapter is can be seen from the following subdivisions: crystalline structure, specific gravity, solubility, melting point, boiling point, optical properties (rotation and refraction), color, calorimetry, structure, and pharmacological action. The information in this chapter is worth the price of the book.

The Acyclic Compounds are subdivided into Nitrogen-free, Nitrogen Compounds and Carbohydrates. The Cyclic Compounds are subdivided into Carbocyclic and Hetrocyclic Compounds. The last part of the book is devoted to "Biocolloids containing Nitrogen" and deals with Proteins (chemistry and uses, including albumins, globulins, proteids, etc.), Ferments (chemistry and action) and Antigens and Antibodies.

The Index of this master work is quite unusually detailed and complete, as the subject index comprises 40 and the authors' index 6 pages of 3 columns each. The book is well printed on good paper with but few typographical errors. A careful study of the work discloses the fact that the author is extremely well acquainted with the subject and has therefore given the world an exceptionally good book. The addition of paragraphs on the history, pharmacology and physiology is of special advantage. Many teachers will find in this book simplifications of pedagogical methods which will be helpful. Students of chemistry and pharmacy will be pleased with the concise but explicit explanations. Chemists, physicians and pharmacists can use the work to good advantage as a text and reference book. The work is indeed a real contribution to the field of science and should also become known on this side of the Atlantic.

OTTO RAUBENHEIMER, PH.M.